T3 Access Multiplexer
DL3100
User's Guide

Part 098-20590-02 Rev. C
November 1998

Digital Link

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Preface

The *DL3100 User's Guide* provides the information you need to install, test, operate, and manage the DL3100.

Audience

This guide is prepared for network managers and technicians who are responsible for the installation of LAN-to-WAN equipment, and who are thoroughly familiar with the network topology in which the DL3100 is expected to operate.

Organization

Chapter 1, *"DL3100 Quick Configuration,"* provides quick configuration information for more experienced users.

Chapter 2, *"About the DL3100,"* provides a description of the DL3100, the components you should have received in your shipping carton, and the hardware requirements for setting up the DL3100 in your network.

Chapter 3, *"Mechanically Installing the DL3100,"* provides guidelines for mechanically installing the DL3100 components.

Chapter 4, *"Configuring the DL3100,"* shows you how to configure the DL3100 for your network environment.

Chapter 5, *"Monitoring and Managing the DL3100,"* provides instructions for monitoring and managing the DL3100's performance.

Chapter 6, *"Diagnosing and Troubleshooting the DL3100,"* provides instructions for diagnosing and troubleshooting the DL3100.

Chapter 7, *"Using the Front Panel Interface,"* provides procedures for configuring, managing and monitoring the DL3100 from the front panel.

Appendix A, *"DL3100 Technical Specifications,"* provides regulatory compliance information, and the electrical, physical, and networking characteristics of the DL3100].

Appendix B, *"DL3100 Connector and Pin Assignments,"* details connector and pin assignments for the DL3100.

Conventions

This section describes the conventions used to delineate specific types of information throughout Digital Link user guides.

Symbols

Symbols denote text that requires special attention. The information contained alongside a symbol corresponds to one of four levels of severity:

NOTE: Follow guidelines in this, or the previous, paragraph to use the Digital Link product more effectively.

CAUTION: Follow guidelines in this, or the previous, paragraph to avoid equipment damage or faulty application.

WARNING: Follow the instructions in this, or the previous, paragraph to avoid personal injury.

ELECTRO-STATIC DISCHARGE — CAUTION: Follow the instructions in this, or the previous, paragraph to avoid the discharge of static electricity, and subsequent damage to the equipment.

Typography

Digital Link manuals delineate the names of files, commands, and actions by using the fonts and typefaces described in the following table:

Typeface or Symbol	Purpose	Example
`Courier Font AaBbCc123`	The names of commands, files, and directories, as well as on-screen computer output.	Edit your `.login` file. Use `ls -a` to list all files. `machine_name% You have mail.`
`Courier Font, Bold AaBbCc123`	The input you provide, as contrasted with on-screen computer output.	`machine_name%` **`su`**
	Keystrokes that you must provide to use the application.	Press **`Ctrl-L`** to refresh the screen.
Palatino Font, Italic AaBbCc123	Command-line placeholder that you replace with a real name or value.	To delete a file, type **`rm`** *filename*
	Book titles, new words or terms, or words that need to be emphasized.	Refer to Chapter 6 in the *User Guide.* These are called *class* options. You *must* be logged in as root to access this directory.
▼ Zapf Dingbats Font	Symbol that denotes a single-step procedure or task. Procedures requiring more than one task are numbered.	
Palatino Font, Bold Blue, Underscore AaBbCc123	Hyperlinks in the table of contents.When viewing the Portable Document Format (PDF) version of the user guide, you can click on one of these to jump directly to the selected subject matter.	
Palatino Font, Blue AaBbCc123 or AaBbCc123	Hyperlinks throughout general text.	
Helvetica Bold	Denotes actual markings on front or back panels.	Attach the cable to the **TERMINAL** port

Digital Link Technical Support

If you should experience difficulty with the setup and/or operation of your Digital Link equipment, the Digital Link Technical Support staff can assist you at any time.

Telephone	**(408) 745-4200**
FAX	**(408) 745-4240**
Email	**support@dl.com**
Internet	**www.dl.com**

Before you place a call for help, use the form provided at the end of this Preface to assemble the information that your technical support representative is likely to request.

Returning a Unit

Use the following procedure if you need to return a unit for service or repair,

1. **Contact the Digital Link Customer Service Department at (408) 745-4200, or via e-mail at era@dl.com, or fax a request to (408) 745-4240 to obtain an ERA (Equipment Return Authorization) number.**
2. **Package the unit carefully and, before sealing the shipping carton, include any information you can provide about the problems you are currently experiencing with the unit.**
3. **Attach an address label to the shipping carton. Be sure to include the ERA number:**

Customer Service Department
Digital Link Corporation
217 Humboldt Court
Sunnyvale, CA 94089
ERA # _____

Send Us Your Comments

Please let us know if this user guide meets your requirements.

Does the manual answer your questions?

Is the manual thorough?

Is the manual easy to use: can you find the information you need?

Is anything missing from the manual?

What would you like to see in the manual?

Digital Link Technical Publications	
FAX	**(408) 745-6250**
Email	**techpubs@dl.com**

All suggestions and comments are appreciated.

1 DL3100 Quick Configuration

This chapter is intended for more experienced users who wish to have a quick reference for the DL3100 configuration. It is assumed that you are familiar with the DL3100.

Configuring the DL3100 is simple and easy. It should take less than five minutes with a little information and this quick configuration chapter. This chapter is meant to configure only critical items. If any options are not mentioned, leave them at the factory default.

For any options(s) not discussed in this chapter or for further information on the DL3100, refer to the remaining chapters and appendices in this guide or contact Digital Link's Technical Assistance Center:

Telephone	**(408) 745-4200**
FAX	**(408) 745-4240**
E-mail	**support@dl.com**
Hours	**24 hour service, 7 days a week**

Required Pre-Configuration Information

1. Does the DTE (router) use a HSSI or V.35 interface to transfer data to and from the DL3100?
2. At what speed (300 kbps-44.2 Mbps) should the DTE port be clocked?
3. Is there a cable to connect the DTE and DL3100?
4. Is the port on the DTE device powered up, attached, configured, and active?
5. What is the T3 (DS3) framing format (M13 or C-Bit)?
6. Is the T3 (DS3) carrier providing timing?
7. Has the circuit been cut-over and tested end-to-end?

Getting Started

The DL3100 can be configured through the front panel or through a VT-100 terminal connection. This chapter will discuss configuration through a terminal. Please refer to Chapter 7, *"Using the Front Panel Interface"* for configuration from the front panel.

Start by logging on to the unit. To do this connect a VT-100 compatible terminal connection to the DL3100 terminal port. Make sure the terminal port settings match that of the DL3100. The default settings on the DL3100 are 9600, N, 8, and 2.

To log on to the unit, you must press **Ctrl-X**, press #, type the node number, and press **Enter**. The factory default node number is 0. If the node number is unknown, press **Ctrl-X** five times for a "roll call" of node numbers. There is no default user name or password on the DL3100. Pressing **Enter** will allow you to skip through these prompts. For configuration of user names and passwords, refer to "Login Configuration" on page 4-14 in Chapter 4, *"Configuring the DL3100."* Once logged in, the unit will display the Node/T3 Main Menu. From here the user can access all configurable options. The options discussed are the critical ones.

Setting a Parameter in a Menu

To set the value of a parameter and confirm or cancel your action:

1. **Move to the value using the up and down arrows.**
2. **Press the Space Bar to cycle through the available options, stop at the desired option, and press Return.**

   Or, when appropriate, type the required value.
3. **You must select Confirm to confirm your action (or select Exit to take no action).**

NOTE: Pressing **Esc** will always take you to the top of the menu.

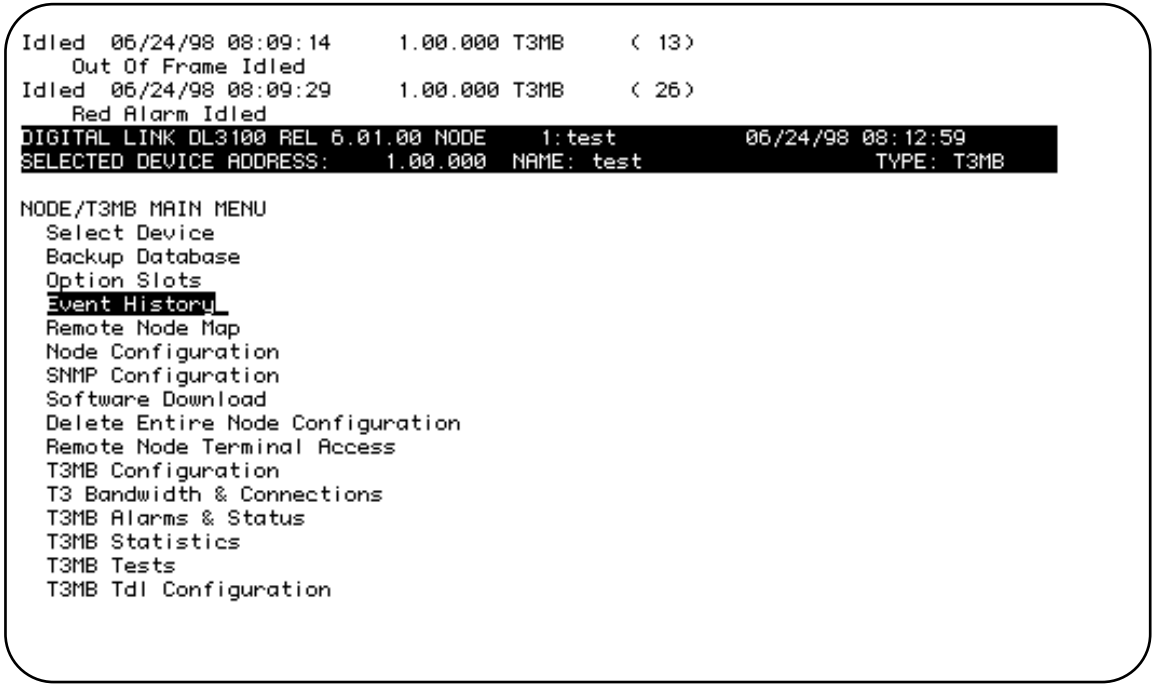


Figure 1-1 Node/T3 Main Menu

Unit Configuration

From the Node/T3MB Main Menu select Node Configuration. In the Node Configuration Menu, select Unit Configuration.

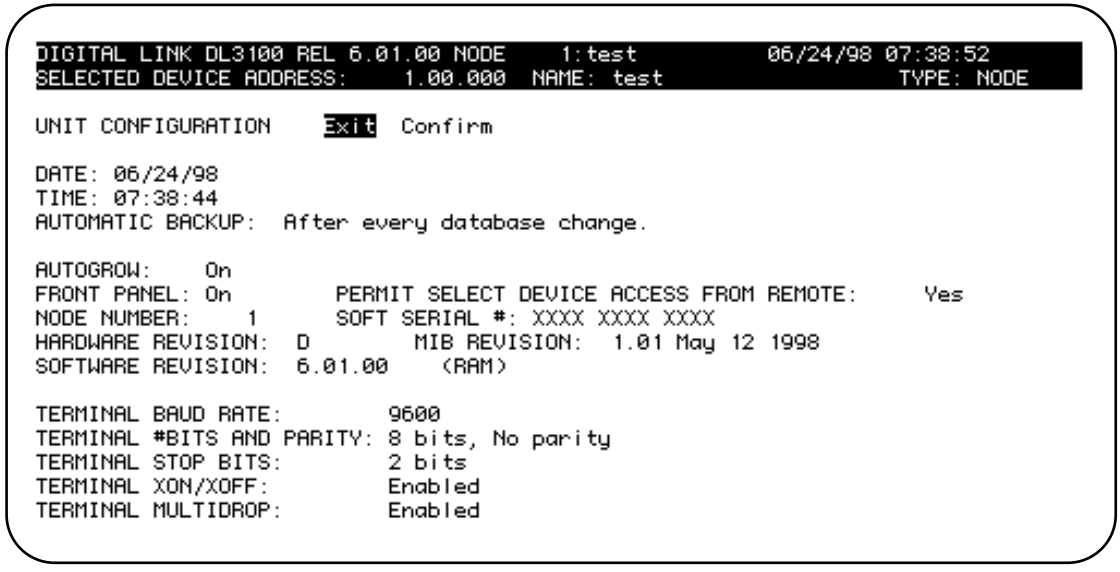

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 07:38:52
SELECTED DEVICE ADDRESS: 1.00.000 NAME: test TYPE: NODE
UNIT CONFIGURATION Exit Confirm
DATE: 06/24/98
TIME: 07:38:44
AUTOMATIC BACKUP: After every database change.
AUTOGROW: On
FRONT PANEL: On PERMIT SELECT DEVICE ACCESS FROM REMOTE: Yes
NODE NUMBER: 1 SOFT SERIAL #: XXXX XXXX XXXX
HARDWARE REVISION: D MIB REVISION: 1.01 May 12 1998
SOFTWARE REVISION: 6.01.00 (RAM)
TERMINAL BAUD RATE: 9600
TERMINAL #BITS AND PARITY: 8 bits, No parity
TERMINAL STOP BITS: 2 bits
TERMINAL XON/XOFF: Enabled
TERMINAL MULTIDROP: Enabled

Figure 1-2 Unit Configuration

Configuration Actions

1. **Set the date (format: MM/DD/YY).**
2. **Set the time (format: HH:MM:SS).**

   The unit uses a 24-hour clock.
3. **Set the Node Number. It should be set at something other than zero and different from the remote DL3100.**
4. **After entering the date, time, and node number, select Confirm and press `Return` to set the parameters.**
5. **Select Exit to return to the Node/T3MB Main Menu.**

T3MB Configuration

From the Node/T3MB Main Menu select T3MB Configuration.

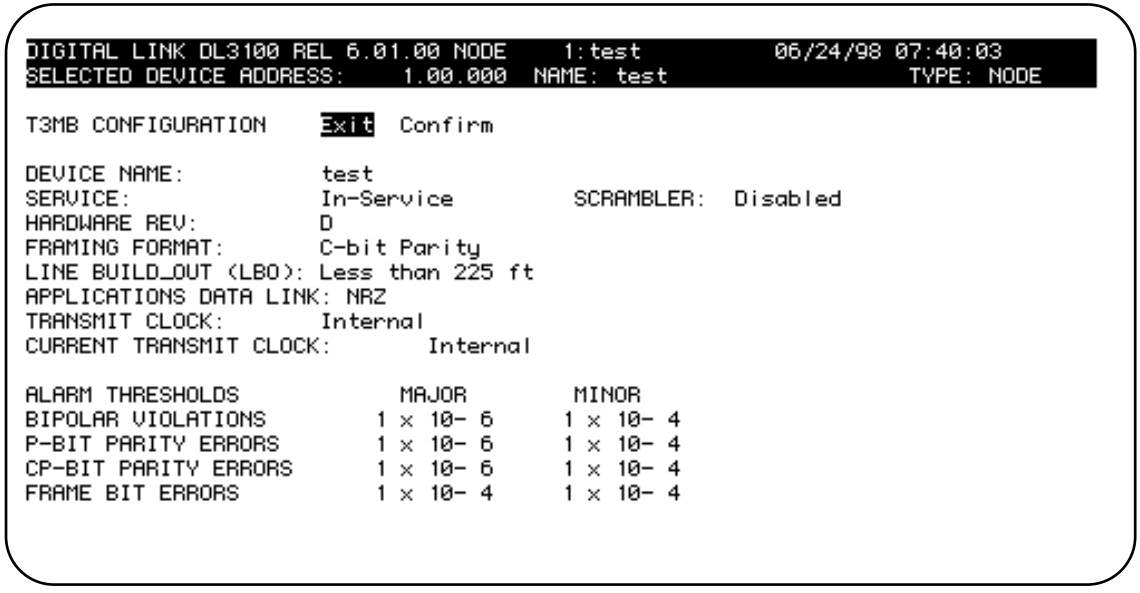

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 07:40:03
SELECTED DEVICE ADDRESS: 1.00.000 NAME: test TYPE: NODE
T3MB CONFIGURATION Exit Confirm
DEVICE NAME: test
SERVICE: In-Service SCRAMBLER: Disabled
HARDWARE REV: D
FRAMING FORMAT: C-bit Parity
LINE BUILD_OUT (LBO): Less than 225 ft
APPLICATIONS DATA LINK: NRZ
TRANSMIT CLOCK: Internal
CURRENT TRANSMIT CLOCK: Internal
ALARM THRESHOLDS MAJOR MINOR
BIPOLAR VIOLATIONS 1 x 10- 6 1 x 10- 4
P-BIT PARITY ERRORS 1 x 10- 6 1 x 10- 4
CP-BIT PARITY ERRORS 1 x 10- 6 1 x 10- 4
FRAME BIT ERRORS 1 x 10- 4 1 x 10- 4

Figure 1-3 T3MB Configuration

Configuration Actions

1. **Set the Device Name, up to 20 characters.**
2. **Set the Scrambler option. When Enabled, this option allows for the DL3100 to "scramble" user data to prevent errors on pattern sensitive fiber equipment along the DS3 transmission path. Both the local and remote DL3100s must be set the same. If you are unsure, set both units for Scrambler Enabled.**
3. **Set the T3 (DS3) Framing Format which the carrier recommends: C-bit or M13. If you are unsure, select C-Bit Parity. Both the local and remote DL3100's must be set the same.**
4. **Set the Line Build Out (LBO): > or < 225 feet. LBO selects the distance between the DL3100 T3 (DS3) interface and the carrier demarcation point.**
5. **Set the Applications Data Link coding: NRZ or NRZI. Applications Data Link sets the T3 Data Link coding. Both the local and remote DL3100's must be set the same. If you are unsure, set both to NRZI.**

6. **Set the T3 (DS3) Transmit Clock: Network or Internal.**

   If the carrier is providing timing on the T3 (DS3) select Network timing. If there is no timing on the circuit, set one DL3100 to Internal and the remote to Network timing. If you are unsure, assume there is no circuit timing and select Net timing.

7. **Select Confirm to set the parameter you changed.**

8. **Select Exit to return to the Node/T3MB Main Menu.**

DTE Port Configuration

From the Node/T3MB Main Menu select Select Device. Type the number **n** (the DTE port connected to your DTE device) and press **Enter**. This action will take you to the HSDB/HVDB Main Menu for DTE port n. The DL3100 can support up to 3 DTE ports; therefore, n = 0-3. If you are unsure, type the number **1** and press **Enter** for DTE port 1.

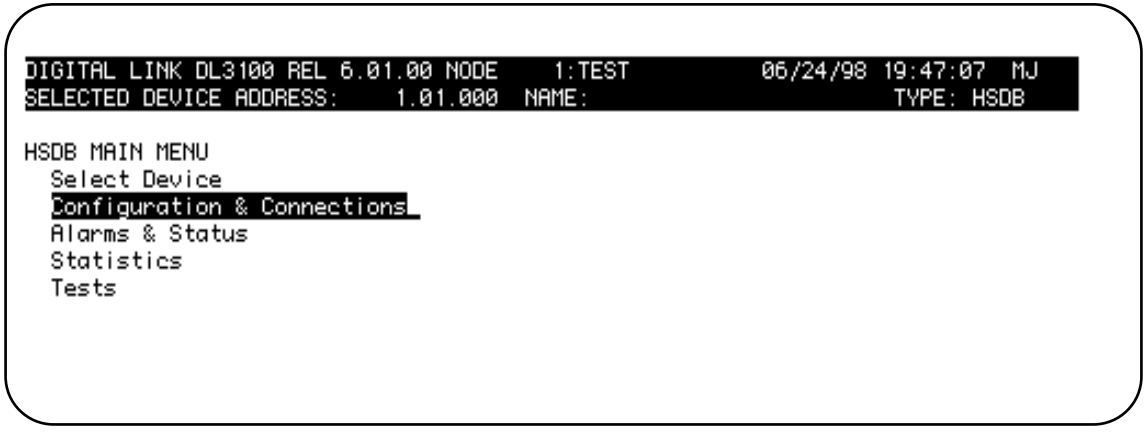


Figure 1-4 HSDB Main Menu

Then select the Configuration & Connections submenu.

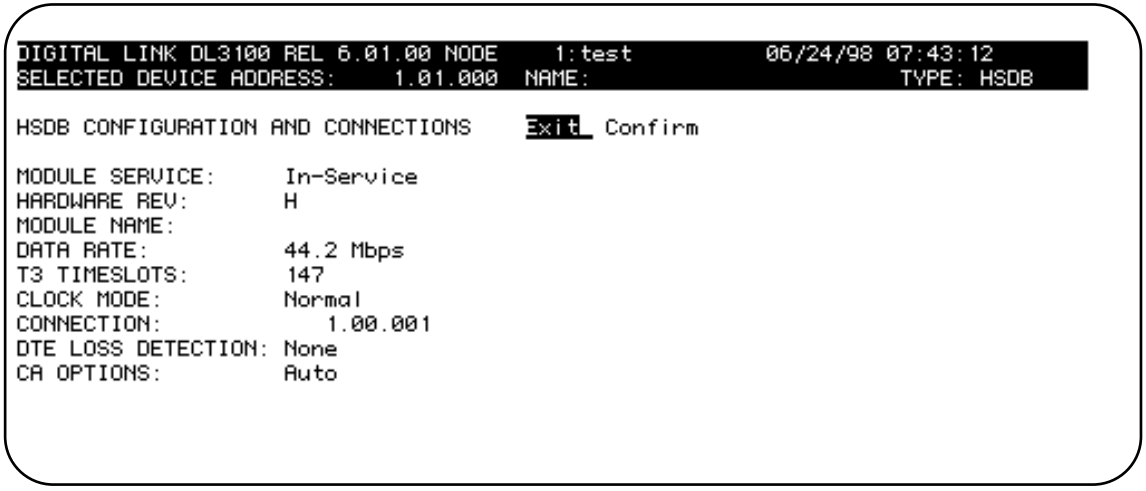

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 07:43:12
SELECTED DEVICE ADDRESS: 1.01.000 NAME: TYPE: HSDB
HSDB CONFIGURATION AND CONNECTIONS Exit Confirm
MODULE SERVICE: In-Service
HARDWARE REV: H
MODULE NAME:
DATA RATE: 44.2 Mbps
T3 TIMESLOTS: 147
CLOCK MODE: Normal
CONNECTION: 1.00.001
DTE LOSS DETECTION: None
CA OPTIONS: Auto

Figure 1-5 HSDB Configuration and Connections

Configuration Actions

- **Set the number of T3 Timeslots to be allocated to the DTE device. Setting the number of T3 Timeslots will set the port rate of the HSSI (HSDB) or V.35 (HVDB) port. The DL3100 splits the T3 (DS3) into 147 timeslots at 300 kbps each. Therefore, assigning 10 timeslots will yield a HSSI or V.35 port rate of 3 Mbps. Setting all 147 timeslots will yield 44.2 Mbps or full T3 (DS3) rate. Both the local and remote DL3100s must be set the same. Because of the V.35 limitations, it is not recommended to assign more than 4 Mbps to the V.35 port with SCT clocking option. With SCTE, you can achieve rates up to 10 Mbps.**

To go back to the Node/T3MB Main Menu, select Select Device from the HSDB/HVDB Main Menu and press **Enter** twice, or type **0** and press **Enter**.

2 About the DL3100

The DL3100 T3 Access Multiplexer (Figure 2-1) provides an economical means of extending high capacity data systems onto wide area public or private T3 networks. Supporting a number of interface types including High Speed Serial Interface (HSSI) and V.35, the DL3100 connects to bridges, routers, front-end processors and channel extenders.

It can function as a T3 Data Service Unit (DSU) or T3 Feeder Multiplexer. The DL3100 interfaces up to three DTE Boards (ports) to one T3 facility, and can be accessed locally or remotely via a dial-up modem or through the T3 line itself in a "modemless" configuration.

Figure 2-1 DL3100 T3 Access Multiplexer

DL3100 Components

The DL3100 system contains the following components:

A T3 main board—The main board houses the network and control circuitry.

From one to three DTE boards—Two types of DTE boards are supported: a high-speed DTE Board (HSDB) and a V.35 DTE Board (HVDB). Each of these interface modules has one DTE port.

A front panel—The front panel consists of a 16-character vacuum fluorescent display, a 4-key keypad, and various LEDs. This panel can be used to provision the unit, run diagnostic tests, or gain access to performance statistics.

A built-in power supply—The power supply has a range of 120 VAC to 240 VAC or -48 VDC. The DL3100 must be ordered as an AC or DC powered unit.

DL3100 Features

The DL3100 offers the following features:

- Easy local installation and configuration using an ANSI (VT100™) compatible terminal
- Remote control through a Hayes-compatible modem or serial link
- Point-to-point connectivity
- Standard DS-3 and C-bit Parity framing format
- User-selectable bandwidth in increments from 300 kbps up to 44.2 Mbps
- Front panel LEDs and test jacks
- HSSI or V.35 electrical interface to the DTE on industry standard connectors
- Provides a self-sychronizing scrambler option that scrambles data before sending it to the network
- Provides local or remote control via an SNMP Management System, ASCII terminal or network management system.
- Allows daisy-chaining of co-located units
- Alarm reporting capability
- Downloadable code
- SNMP MIB II support. In addition to supporting RFC 1157, 1213 and 1407, a device-specific enterprise MIB is also available
- FEAC code support per T1.107a

How the DL3100 Works

The DL3100 allows you to configure the data rate of each payload signal. For example, you can select a data rate of 21 Mbps for a particular DTE data interface module. The data rate and routing information is sent to the T3 main board where a database of all associated connections is maintained.

The T3 main board uses this information to direct the appropriate segment of T3 bandwidth to the appropriate data interface module. It also controls incoming data flow from the data interface modules and controls access to the data bus.

How Signal Flows from T3 Interface to the DTE Board

The T3 receive signal is first terminated at the T3 main board BNC connector. Once recovered, the payload data is written into a buffer where demultiplexing occurs.

The DTE payload data is written from the backplane into buffers on the receiving module. There it is processed into the appropriate format and data rate. The resulting signal is routed back to the data interface connector where it exits the system.

How Signal Flows from Data Interface to T3 Interface

The signal flow described below uses a HSSI interface to HSDB as an example, but it is the same for all the DTE boards supported.

The data signal first terminates on the HSDB interface connector. The signal is then routed to the HSDB, where the signal is recovered for further processing. Once recovered the data is written to and stored in a buffer until it is accessed by the T3 main board.

The T3 main board accesses the HSDB module by asserting the HSDB address onto the address bus and initiating a read command. Once accessed, the HSSI data is read onto the data bus and written into a buffer on the T3 main board. The T3 main board then multiplexes the HSSI data with other data inputs, if any, to be transported by the DL3100. The composite signal is then processed for T3 transmission and sent to the T3MB network connector where it exits the system.

3 Mechanically Installing the DL3100

The following table prioritizes the tasks you will need to perform to successfully install the DL3100. Refer to the pages noted for detailed instructions of each task:

Table 3-1 Installation Steps

Installation Steps and Page Numbers
"Preparing for the Installation" on page 3-1
"About Mounting the Unit in a Rack" on page 3-4
"Installing the DL3100 with AC Power" on page 3-6
"Connecting the DL3100 to a T3 Network" on page 3-8
"Connecting the DL3100 to a DTE" on page 3-8
"Connecting the DL3100 to an External Clock Source" on page 3-9
"Connecting an ASCII Terminal" on page 4-1

When you complete these steps, you are ready to configure the DL3100. For more information on configuring, refer to Chapter 4, *"Configuring the DL3100."*

Preparing for the Installation

Before you begin the installation, you need to:

- Unpack and inspect the DL3100 for damage that may have occurred during shipment. Wipe off the exterior with a soft cloth, if necessary.
- Save all packing slips and documents included with the unit. Save the shipping cartons and packing materials until you have completed the installation and verified the operation.

- Make sure that you have received all the items ordered. Your shipment should consist of the following:

  DL3100 T3 Access Multiplexer

  Cables ordered for your network environment

  One power cord

  This manual

- Fill out and mail the registration card.

WARNING: Voltages as high as 200 VDC may exist at the telephone company's T3 interface in the form of simplex power. These voltages are hazardous and can cause death or severe injury!

Do not proceed with this installation if any voltage is present between the send and receive pairs of the network interface. You can ask the serving telephone company to temporarily disconnect the simplex power for the installation.

Required Location and Equipment

Install the DL3100 in a restricted access area in accordance with the National Electric Code, ANSI/NFPA 70, Articles 110-16, 110-17, and 110-18. An example of a restricted access area is a dedicated equipment room or closet that is clean, well-ventilated, and free of environmental extremes. Allow two to three feet of clearance around the unit for access during installation.

Make sure you have the following equipment ready:

Table 3-2 Required Equipment

Equipment	Function
Screwdriver and rack screws	For mounting and miscellaneous functions
VT-100 ANSI terminal (or compatible)	To perform the initial unit configuration
RS-232 straight-through cable with DE-9 connectors	To connect the unit to the terminal, SNMP station or modem
DTE cables:	To connect each card to the DTE driver:

Table 3-2 Required Equipment (Continued)

Equipment	Function
25-twisted-pair cable with 50-pin male connectors	To connect the unit to a HSSI-compatible DTE device
V.35-compatible, shielded cable with DB-25 male connector on the DL3100 end	To connect the unit to a V.35-compatible DTE device
T3 75 Ω coax RG59 cables	To connect the T3 network to the BNC network connectors on the back panel
Ribbon-type cable with DE-9 connectors	If connecting DL3100s in a daisy chain for centralized management

For more information about cable and connector pinout assignments, see Appendix B, *"DL3100 Connector and Pin Assignments."*

About Your Power Supply

You can have either an AC or DC power supply.

AC power—Each AC powered DL3100 comes with a 120 VAC/60 Hz power cord.

DC power—A terminal strip is provided on the DL3100's rear panel for power from a -48 VDC power source. Of the eight screws on the terminal strip, the two far right screws (as you're facing the rear panel) are for DC powering.

NOTE: The DL3100 is designed to operate with negative power supply. Be sure to connect the positive terminal to ground.

About Grounding

You will ground the DL3100 using a cable connected to a screw terminal on the DL3100 rear panel. For information about grounding cables, see Appendix A, *"DL3100 Technical Specifications."*

Make sure your T3 network cable or remote system connects the T3 network shield to a ground.

About Mounting the Unit in a Rack

The DL3100 can be front or mid-mounted in a 19-inch or 23-inch rack.

Allow about two inches of space between units on the rack.

Front-mounting the Unit in a 19-inch Rack

To front-mount the DL3100 in a 19-inch rack:

Mount the unit in a 19-inch rack using four rack mounting screws, two on each side as shown in Figure 3-1.

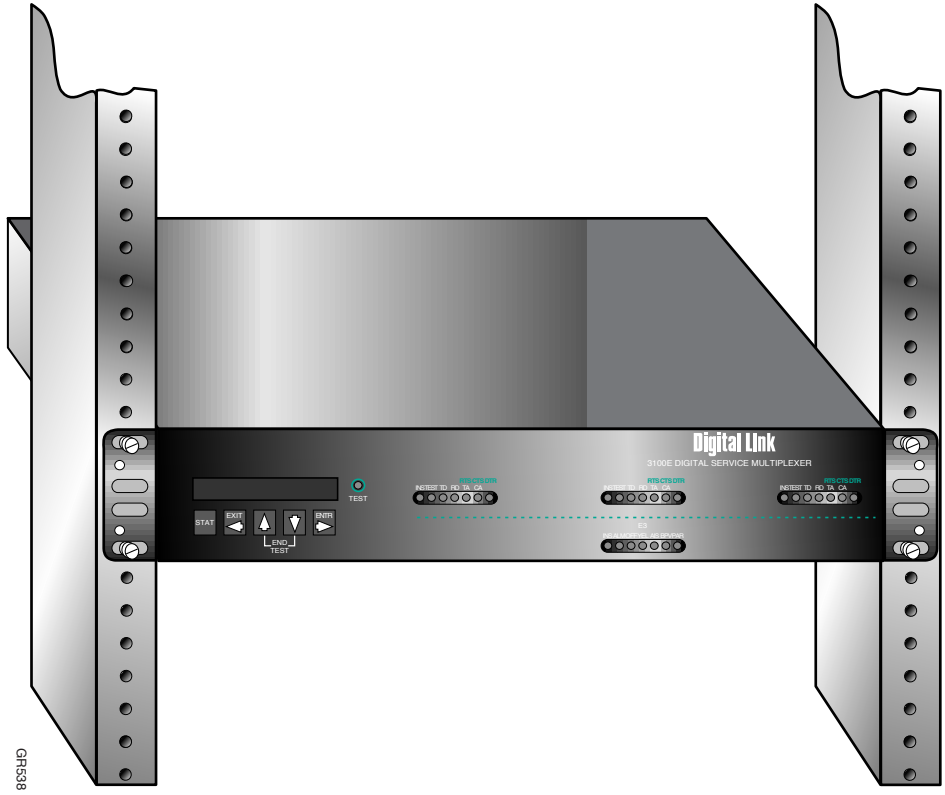


Figure 3-1 DL3100 Front Mounted in a 19-inch Rack

Front-mounting in a 23-inch Rack

To front-mount the unit in a 23-inch rack:

▼ **Remove the ears from the unit and reattach them so that the wider sections of the ears face front. Attach the unit to the rack.**

Mid-mounting the DL3100

To mid-mount the unit in a 19-inch rack:

▼ **Remove the ears and attach them to the unit's middle holes. Attach the unit to the rack.**

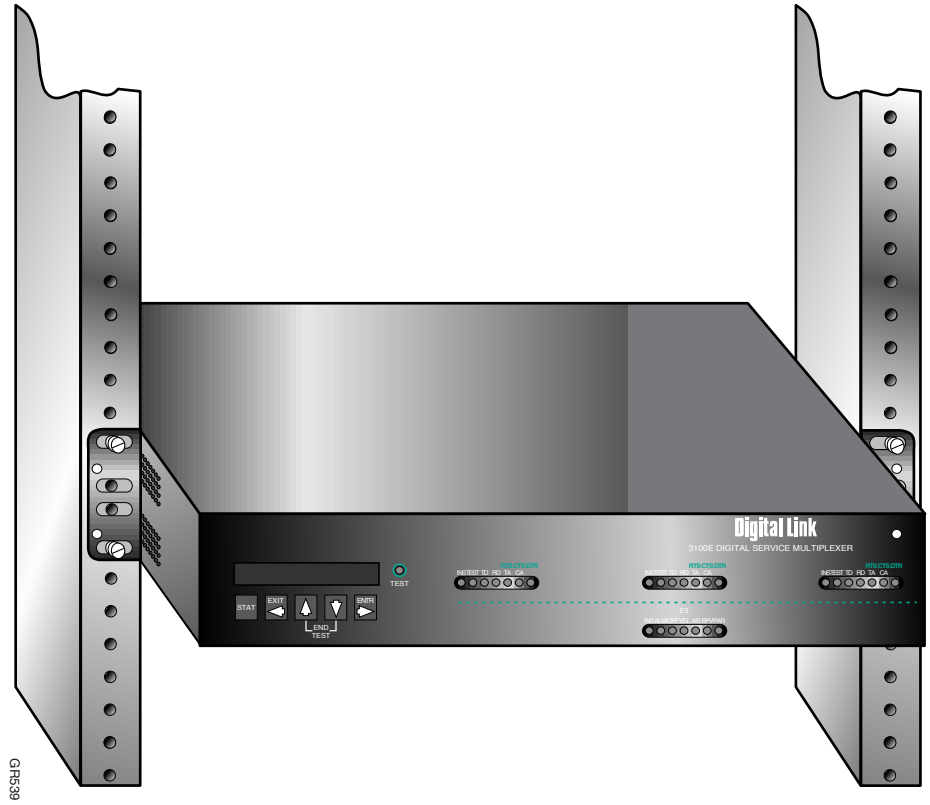


Figure 3-2 DL3100 Mid-mounted in a 19-inch Rack

Installing the DL3100 with AC Power

To mechanically install the DL3100 when using AC power, perform the following steps:

1. **Mount the DL3100 on a flat surface or in a rack.**
2. **Ground the DL3100 by connecting a grounding cable to the screw terminal labeled FGND on the rear panel's terminal block.**
3. **Connect the AC power cord to the AC power socket on the rear panel of the DL3100, and plug the other end into the nearest AC outlet.**

NOTE: An AC power cord is supplied with the DL3100 to provide 120 VAC to 240 VAC power. An AC powered unit has a terminal block that is identical to a DC powered unit. The unit must be powered with AC voltage.

Installing the DL3100 with DC Power

When using DC power, you will need the following:

- A tray cable which must be UL recognized 14 AWG, TC, 600 V 90ºC. (Alpha Wire Company No. 45443 is an example.)
- 3 conductors
- Copper strand wire

Figure 3-3 shows the terminal block on the rear panel. To mechanically install the DL3100 when using DC power, perform the following steps:

1. **Place the DL3100 on a flat surface or in a rack.**
2. **Before you connect the DL3100 to the centralized DC power source, strip two inches of jacket material off the tray cable and ½ inch of insulation off each wire.**

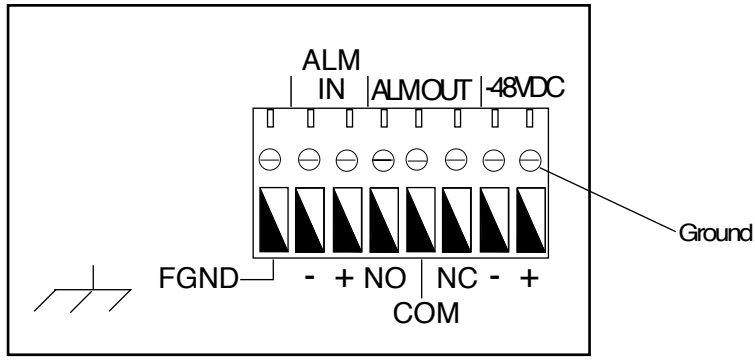


Figure 3-3 Terminal Block on Rear Panel

3. **Connect the -48 VDC wire to the - terminal (on the rear panel's terminal block, Figure 3-3) using a small flat screw driver to fasten the wire.**

4. **Connect the ground (+) wire to the + terminal in the same way.**

NOTE: The unit is designed to operate with negative voltage; therefore, you must connect the positive terminal to ground.

5. **To minimize disturbance to the wires through casual contact, secure a tray cable near the rack frame using multiple cable ties. Use at least four cable ties, a minimum of four inches apart. The first tie should be within six inches of the terminal block.**

6. **Connect the DL3100 to a DC power source.**

WARNING: Damage to the DL3100 may result if power is connected improperly.

Do not operate the DL3100 without an earth ground connection to the ground stud or FGND terminal!

The DL3100 automatically runs a self-test at power up, during which the front panel displays a self-test message. Payload service resumes upon completion of the self-test and the front panel displays the following default message:

```
EFS 00.0 PERCENT.
```

Connecting the DL3100 to a T3 Network

You will need a WECO 728A cable or its equivalent to connect the DL3100 to the T3 network.

The DL3100 has two BNC T3 network connectors located on its rear panel (labeled RCV and XMT) (Figure 3-4).

To connect the DL3100 to a T3 network:

▼ **Connect one end of the network cable to the DL3100's BNC connectors, and the other end to the standard patch panel BNC connection.**

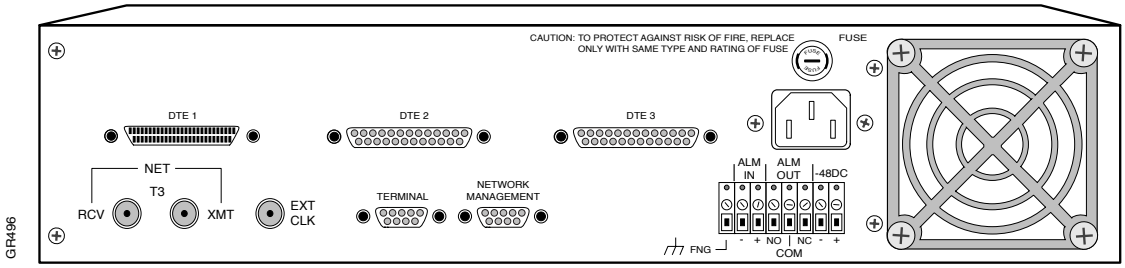


Figure 3-4 DL3100 Rear Panel

Connecting the DL3100 to a DTE

The DL3100 provides three DTE interface connectors on its rear panel (Figure 3-4). The unit can be ordered with any combination of the following interface connectors (up to three):

- 50-pin SCSI socket for a HSSI compatible DTE device
- DB-25 socket for a V.35 compatible DTE device

To connect the DL3100 to a HSSI-compatible DTE:

- Use a 50-pin twisted pair SCSI-type cable with an overall foil/braid shield. The cable must have plug connectors at the DL3100 end.

  Connect one end of the DTE cable to the DL3100's 50-pin SCSI socket, and connect the other end to the DTE equipment.

To connect the DL3100 to a V.35-compatible DTE:

- Use a shielded cable with DB-25 plug connectors on one end and V.35 (M34) on the other end.

  Connect one end of the DTE cable to the DL3100 DB-25 socket, and connect the other end to the DTE equipment.

Connecting the DL3100 to an External Clock Source

To provide clocking to the DL3100 from an external source, connect the appropriate cable to the BNC socket provided on the rear panel of the DL3100.

NOTE: You will need to use a WECO 728-compatible RG59 cable.

For more information about external clock specifications, refer to "External Clock Specifications" on page A-1 in Appendix A, *"DL3100 Technical Specifications."*

4 Configuring the DL3100

To configure a DL3100, you can use the terminal interface by connecting an ASCII terminal to the DL3100's comm port.

This chapter describes how to connect the terminal and how to configure the DL3100 T3 Access Multiplexer from a terminal.

Required Information

Before you configure the unit, we suggest you collect the following:

- The DSU/CSU IP address and IP subnet mask. You will need these to establish a telnet connection to the DSU/CSU from a remote terminal and enable SNMP network management.
- Framing and line code requirements as specified in the work order from your service provider

Keeping a Record

We suggest you keep a written record of each unit's configuration. For a copy of the configuration worksheet, see "Configuration Worksheet" on page A-11 in Appendix A, *"DL3100 Technical Specifications."*

Connecting an ASCII Terminal

You can connect the terminal to the TERMINAL port either directly, or through a daisy-chained or dial-up modem connection.

Before you connect the terminal, you need to make sure that the bit rate, parity bit, word length and stop bit settings on the terminal or modem match the DL3100 settings.

Checking the Default Settings

The default settings are as follows:

baud rate—9600, parity bit—none, word length—8, stop bits—2

If these settings are not the same, reconfigure the DL3100's default settings using the front panel controls. For more information on the front panel, see Chapter 7, *"Using the Front Panel Interface."*

Connecting a Terminal to a Comm (Terminal) Port

The DL3100 has two 9-pin comm port sockets on its rear panel, labeled TERMINAL and NETWORK MANAGEMENT. These are provided for connection to the ASCII terminal or SNMP workstation.

NOTE: To enable daisy-chaining—Pin 8 (CTS) on the comm port side of the connector is connected to Pin 8 on the other connector. If your cable is not from Digital Link, be sure that pin 8 is disconnected at the terminal end of the connector.

Regarding Distance: If the comm port baud rate is 9600, place the terminal within 50 feet of the port. You may increase the distance if you reduce the baud rate.

To connect a terminal to the TERMINAL port socket on the DL3100 rear panel:

▼ **Using the DE-9 RS-232 straight-through ribbon cable, connect the DE-9 plug into the DL3100 DE-9 socket and the other end into the terminal's connector. Figure 4-1 shows the TERMINAL and NETWORK MANAGEMENT ports on the rear panel.**

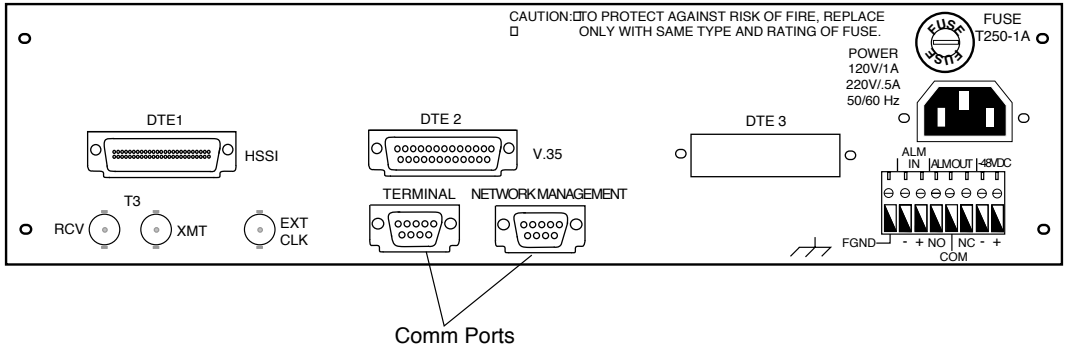


Figure 4-1 Ports on the Rear Panel

Connecting the Terminal Port through a Modem

To connect the terminal port of the DL3100 through a modem, you need a DB-25 to DE-9 null modem cable.

NOTE: Digital Link can provide 9-pin to 25-pin adapters, as well as null-modem adapters if they are required.

If the comm port baud rate is 9600, the distance between the TERMINAL port and the modem cannot exceed 50 feet. You can increase the distance if you reduce the baud rate.

To connect a modem to the TERMINAL port:

1. **Make sure the connection is a DB-25 to DE-9 null modem cable.**
2. **Make sure the DL3100's baud rate, parity bit, and stop bit settings match the modem's.**

   If they do not, change the settings on the DL3100 using the front panel controls.
3. **Using the DB-25 to DE-9 RS-232 null modem cable, connect the modem to the appropriate DE-9 connector on the DL3100's rear panel. (Figure 4-1.)**
4. **Connect the modem to the phone line.**

Connecting Multiple Units in a Daisy-chain

You can connect up to twelve DL3100 units in a daisy-chain, for centralized network monitoring and management capabilities.

To daisy-chain DL3100 units, use a cable with DE-9 connectors (available from Digital Link).

Connect multiple DL3100 units in a daisy-chain:

1. **Using a cable with DE-9 connectors, connect the cable's DE-9 socket connector to the terminal (or modem if at a remote site).**

   Ribbon-type cables can be ordered from Digital Link by the following part numbers:

   Table 4-1 Part Numbers for DL3100 Units

To daisy chain:	Order Part No.
Four units	154-00051-01
Eight units	154-00052-01
Twelve units	154-00053-01

2. **Connect the cable's DE-9 plug connector to the TERMINAL port socket on each DL3100 (Figure 4-1).**

   Change the TERMINAL port setting to Multidrop Mode on all units.

3. **To multidrop the NETWORK MANAGEMENT port, connect the cable's DE-9 plug connector to the NETWORK MANAGEMENT port socket on each DL3100. Plug the socket end of the DE-9 cable to your NMS workstation.**

   The connection between your DL3100 and your NMS workstation must be a SLIP connection.

For detailed instructions on installing SNMP systems, refer to the separate installation guides for these products.

NOTE: When units are daisy-chained together, the units must be operating in Multidrop Mode. For more information about Multidrop Mode, see "Configuring the DL3100" on page 4-10. Each unit should be given a unique node number.

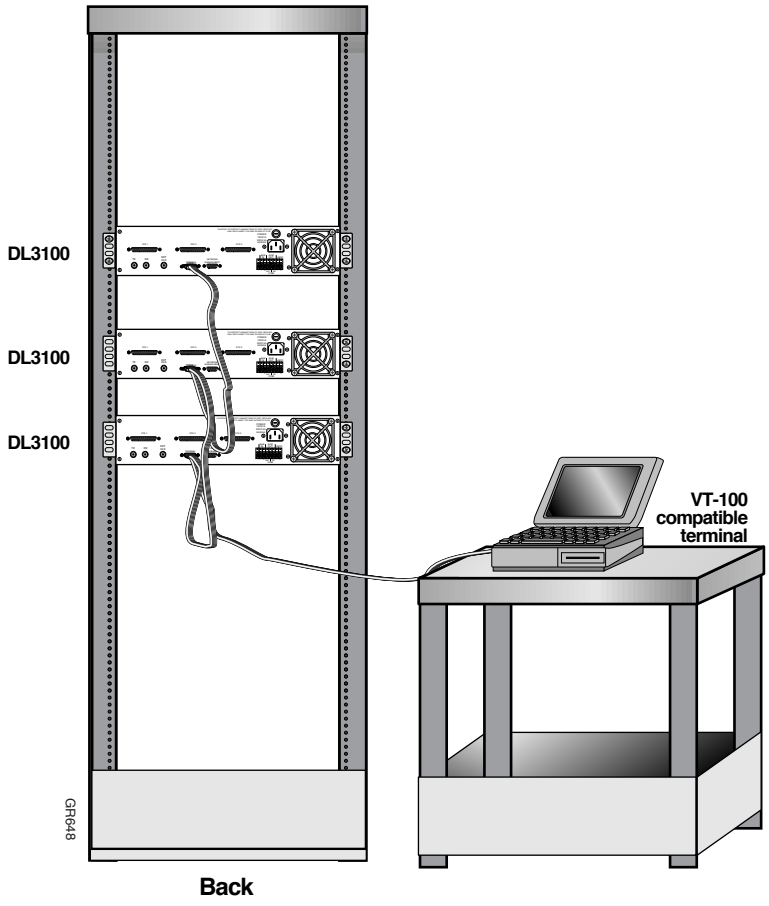


Figure 4-2 Daisy-chained DL3100 units

Logging on to the DL3100

To log on to the DL3100:

1. **If you know the node number, skip to step 3.**
2. **If you do not know the node number, press `Ctrl-X` five times to display a roll call of all node numbers.**
3. **Type `Ctrl-X` one time.**
4. **Type the pound sign (#).**

5. **Type the node number and press `Return`.**

   You will see the prompt:

   ```
   User name:
   ```

6. **Enter a valid user name. If a user name has not been configured, press `Enter` to bypass this field.**

   The following prompt appears:

   ```
   Password:
   ```

7. **Enter a valid password. If a password has not been configured, press `Enter` to bypass this field.**

The Node/T3MB Main Menu appears. (Figure 4-3.)

If it does not appear, you may have an incorrect node number, a bad connection on the comm port or a bad comm port configuration.

8. **To log on to another DL3100 on the same daisy chain, press `Ctrl-X`, then type the pound sign (#) followed by the node number. Press `Return`.**

   To log off all units, press **`Ctrl-X`** and press **`Return`**.

Using the Terminal Interface

The DL3100 terminal interface contains a number of menus which you use to configure, monitor and manage the DL3100.

When you log on, the Node/T3MB Main Menu appears.

To select a submenu, move the highlight bar through the menu screen using the up and down arrows. When the desired menu is highlighted, press **`Return`**.

Press **`Escape`** to bring the display back to Select Device when in the main menus, and back to Exit when in the execution menus.

To exit any menu and return to the Node/T3MB Main Menu, select Exit and press **`Return`**.

To redraw a screen, press **`Ctrl-L`**.

Selecting a Device

Before performing any activities, you must first select a device. You can select a device from any of the main menus.

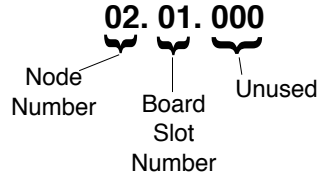
To select a device from a main menu:

1. **Move the highlight bar to the Select Device field and press `Return`.**

   The highlight bar will then move to the Selected Device Address field in the status bar.

2. **Enter the device address and press `Return`.**

   A device address is a seven-digit identifier that designates the physical location of a device within the unit. It contains three fields delimited by periods. The example below defines each field and shows the address of the board in slot 1 of node number 2.



NOTE: To view a list of the slot numbers for each device in the unit, select Option Slots from the Node/T3MB Main Menu.

To change an existing address, backspace over it to delete it, and type the address of the device you wish to access. (A valid node number can range from 1 to 9,999.)

When selecting a Node/T3MB, you only need to enter the first field of the device address.

When selecting an HSDB or HVDB, enter the device address as shown in Step 2 on page 4-7. There are three board slots (numbers one through three) that correspond to DTE boards one, two, and three.

What You'll See on the Screen

Figure 4-3 describes the general layout of the terminal interface screens, using the Node/T3MB Main Menu as an example.

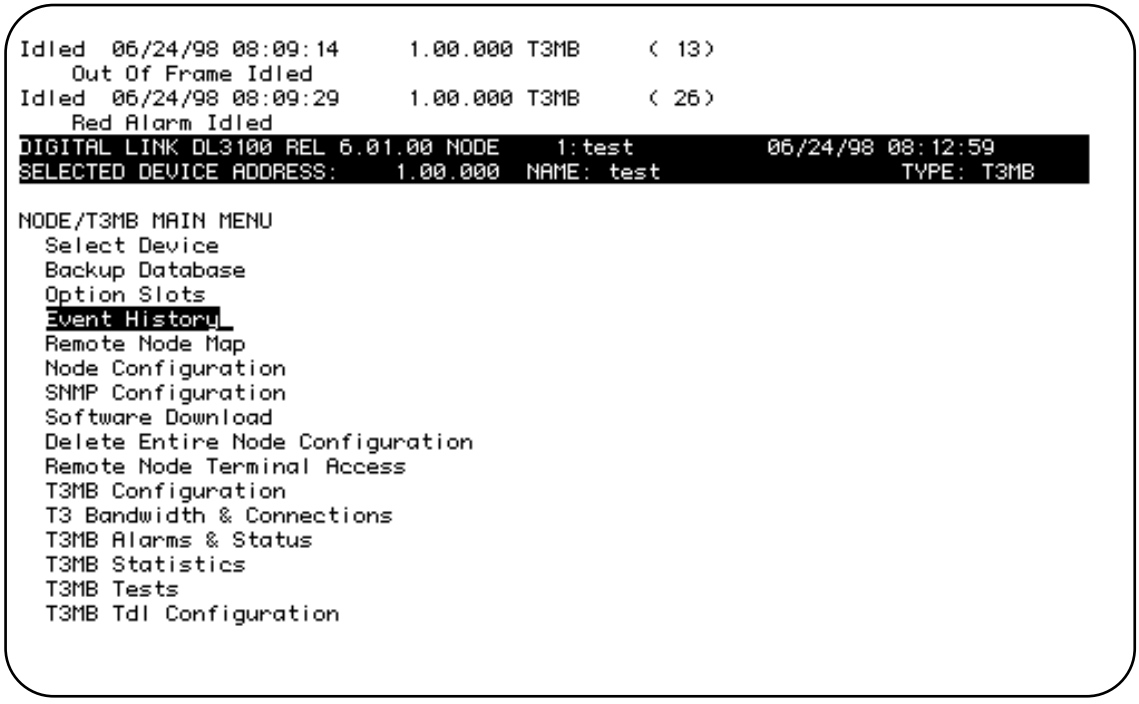


Figure 4-3 Node/T3MB Main Menu

Node/T3MB Main Menu Selections

The Node/T3MB Main Menu offers the following selections:

- Select Device
  (Default—Local node address)

  Allows you to move to the main menu of the remote node or any DTE board.

  Enter the address of the device you wish to access.

- Backup Database

  Lets you manually backup the database to EEPROM.

- Option Slots

  Lets you see which DTE boards occupy which DTE slots on the T3 Main Board.

- Event History

  Displays the DL3100's event history and lets you reset alarms.

- Remote Node Map

  Displays the numbers of the remote nodes and the status of the link (up or down).

- Node Configuration

  Lets you configure certain parameters of the DL3100.

- SNMP Configuration

  Lets you configure the DL3100 to communicate with an SNMP Management System.

- Delete Entire Node Configuration

  Lets you delete the node's configuration and return to the factory default settings.

- Remote Node Terminal Access

  Lets you log into the DL3100 or DL3900 on the other end of the T3.

- T3MB Configuration

  Lets you configure certain parameters on the T3MB.

- T3 Bandwidth and Connections

  Lets you allocate bandwidth and make connections on the T3MB.

- T3MB Alarms and Status

  Displays current alarm and status reports for the T3MB and DS3 signal.

- T3MB Statistics

  Displays current performance statistics of the T3MB and lets you clear the counters.

- T3MB Tests

  Lets you perform diagnostic loopbacks.

- T3MB TDL Configuration

  Lets you configure the Terminal Data Link.

This chapter describes the Configuration menus.

Configuring the DL3100

To configure a local or remote DL3100, you need to configure the:

- Basic node parameters in the Node Configuration Menu.
- The T3MB in the T3MB Configuration Menu.
- The T3MB Terminal Data Link (TDL) in the T3MB TDL Configuration Menu.
- The HSDB or HVDB in the HSDB/HVDB Configuration and Connections Menu.
- SNMP parameters in the SNMP Configuration Menu (for SNMP management capability).

To open the individual configuration menus, use the up and down arrows to select the configuration menu name from the Node/T3MB Main Menu and press **Return**.

Configuring the Node

You use the Node Configuration Menu to configure the basic parameters of the DL3100.

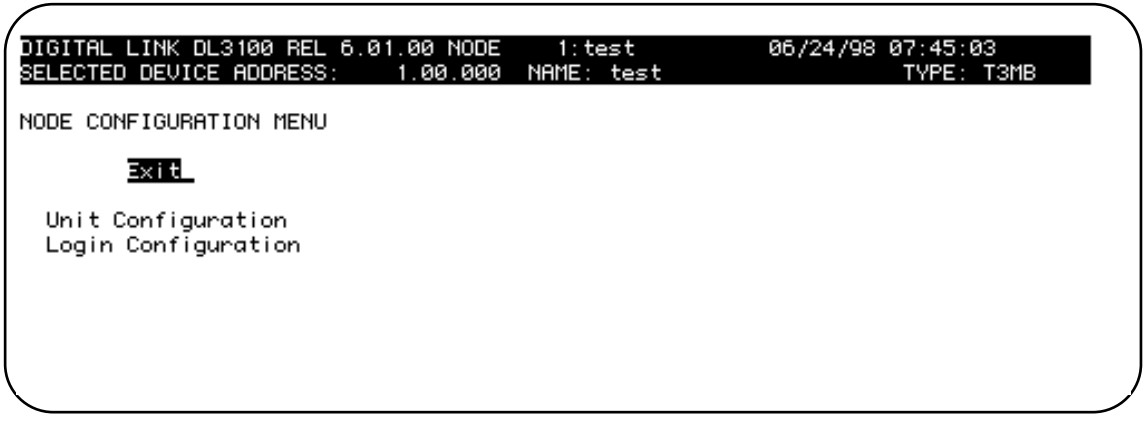

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 07:45:03
SELECTED DEVICE ADDRESS: 1.00.000 NAME: test TYPE: T3MB
NODE CONFIGURATION MENU
Exit
Unit Configuration
Login Configuration

Figure 4-4 Node Configuration Menu

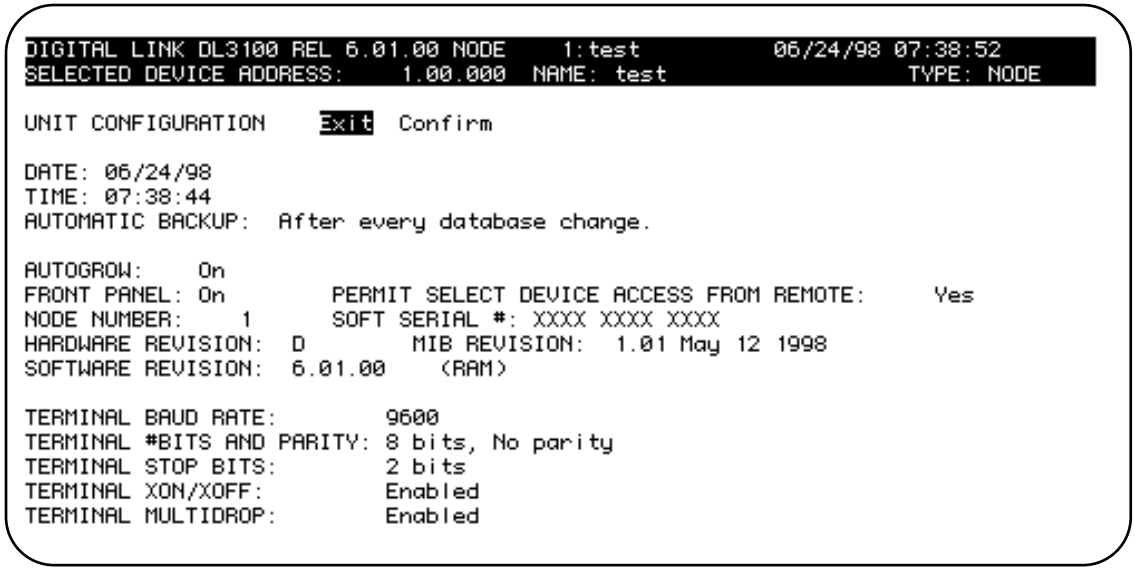

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 07:38:52
SELECTED DEVICE ADDRESS: 1.00.000 NAME: test TYPE: NODE
UNIT CONFIGURATION Exit Confirm
DATE: 06/24/98
TIME: 07:38:44
AUTOMATIC BACKUP: After every database change.
AUTOGROW: On
FRONT PANEL: On PERMIT SELECT DEVICE ACCESS FROM REMOTE: Yes
NODE NUMBER: 1 SOFT SERIAL #: XXXX XXXX XXXX
HARDWARE REVISION: D MIB REVISION: 1.01 May 12 1998
SOFTWARE REVISION: 6.01.00 (RAM)
TERMINAL BAUD RATE: 9600
TERMINAL #BITS AND PARITY: 8 bits, No parity
TERMINAL STOP BITS: 2 bits
TERMINAL XON/XOFF: Enabled
TERMINAL MULTIDROP: Enabled

Figure 4-5 Unit Configuration Menu

NOTE: To save your changes, you must select Confirm (or select Exit to take no action).

Unit Configuration Menu Parameters

The Unit Configuration Menu parameters are:

- DATE

  Enter a valid date using the format mm/dd/yy.

  mm 1-12 month

  dd 1-31 date

  yy 0-99 year (90-99 = 1990-1999; 0-89 = 2000-2089)

  Example: 5/28/2 yields 05/28/02

- TIME

  Enter a valid time with the format hh:mm:ss.

  hh 0-23 hours

  mm 0-59 minutes

  ss 0-59 seconds

  Example: 8:4:39 yields 08:04:39

- Autogrow—On or Off (Default—On)

  This feature is for factory use only and should remain On.

- Automatic Backup—15 seconds, 30 seconds, one minute, or five minutes after a database change; after every database change; Off. (You must select Confirm to save your change). (Default—5 minutes after a database change)

  Select the amount of time when the database, if modified, is automatically backed up to the EEPROM.

NOTE: You can also back up the database manually with the Backup Database command in the Node/T3MB Main Menu. (See "Backing Up the Database" on page 5-27 in Chapter 5, *"Monitoring and Managing the DL3100."*)

- Front Panel—On or Off (Default—On)

  Lets you configure or run tests using the front panel display buttons.

- Permit Select Device from Remote

  Permits or denies a remote user access to the local DL3100 by setting this parameter to Yes or No.

- Node Number—1 to 9,999 (Default—0)

  Enter a number between 1 and 9,999 to assign a unique number to each DL3100.

NOTE: Each unit must be set to a different number, to allow remote communication and daisy chaining of multiple units. If the remote unit is set to the same number as the local unit you will not be able to access the remote unit.

Do not assign a blank number! This causes the unit to be always logged on and it cannot be logged out until it is assigned a number. You are not able to log on to another DL3100 if its node number is blank or zero.

- Soft Serial #

  A read-only field that specifies a preset number from the factory.

- Hardware Revision

  Set by the factory and cannot be changed. Allows the user to view the hardware revision level to be used when troubleshooting the unit.

- MIB Revision

  Current revision of the MIB. Set by the software installed and cannot be changed.

- Software Revision

  Identifies the software in the unit. Cannot be changed.

- Terminal Baud Rate—300, 600, 1200, 2400, 4800, 9600 (Default—9600)

  Select a baud rate to match the baud rate on the connected terminal or modem.

- Terminal #Bits and Parity—7 or 8 bits; Odd, Even, or None (Default—8 bits; None)

  Select the number of bits and parity to match the number of bits and parity on the connected terminal or modem.

- Terminal Stop Bits—1, 1.5, or 2 bits (Default—2 bits)

  Select the stop bits to match the stop bits on the connected terminal or modem.

- Terminal XON/XOFF—Enabled or Disabled (Default—Enabled)

  Enabled—Enables a software flow control feature which causes the DTE device to stop sending data when the terminal's buffers are full. You can resume the flow of data, by pressing any key and stop it by pressing **Ctrl-S**.

  Disabled—Set to Disabled when your terminal or network management station does not support XON/XOFF.

- Terminal Multidrop—Enabled or Disabled (Default—Enabled)

  Enabled—If the terminal is connected to more than one DL3100 unit, this must be set to Enabled. It enables you to daisy-chain and monitor up to 12 DL3100s for centralized network management.

Login Configuration

The Login Configuration Menu lets you add users, set the login passwords, set the access type, and activate automatic logout.

To open the menu, select Login Configuration in the Node Config Menu and press **Return**.

```
DIGITAL LINK DL3100 REL 6.01.00 NODE    1:test          06/24/98 07:46:26
SELECTED DEVICE ADDRESS:    1.00.000  NAME: test                TYPE: T3MB

LOGIN CONFIGURATION     Exit  Confirm

  USER IDENTIFICATION   PASSWORD          ACCESS TYPE(S)
1)                                        Full access
2)                                        No access
3)                                        No access
4)                                        No access
5)                                        No access
6)                                        No access
7)                                        No access
8)                                        No access


TERMINAL AUTOMATIC LOGOUT:  Off.  (Must use Logout to return to login prompt).
  TELNET AUTOMATIC LOGOUT:  5 minutes after no keyboard activity.
```

Figure 4-6 Login Configuration Menu

When you log on to a DL3100 for the first time you are User 1 with full access privileges.

You can add seven additional users. Each user can have a password. The default for the User Identification field and Password field is empty. Just press **Return** at the prompts. The fields are case sensitive.

Login Configuration Parameters

Before you set any parameter in the Login Configuration Menu, heed these warnings!

WARNING: Be sure to give at least one user Full Access rights.

If no user has full access rights or if you don't know the password to log on, no one can access the DL3100.

Call Digital Link Technical Support. The unit will have to be returned to the factory to be reset.

The Login Configuration parameters are as follows:

- User Identification and Password (text string)

  Enter an alphanumeric text string for each (max—16 characters). Both are case sensitive.

- Access Types:

  a. Display Only—View only rights; the user cannot make changes or initiate tests.

  b. Maintenance—User can initiate tests, clear the Events History Log and clear statistics.

  c. Provision—User can configure the DL3100 (with the exception of SNMP configuration).

  d. Provision & Maintenance—User has Provision and Maintenance rights.

  e. Full Access—User can view all menus and perform all functions.

  f. No Access—User has no access, no rights.

NOTE: The default is User 1: Full Access, others: No Access

When you attempt to do something for which you have no rights, the system informs you:

```
Access denied - your account does not have this PRIVILEGE.
```

- Automatic Logout:—OFF, 3 - 5 - 10 - 30 minutes after no keyboard activity (Default—OFF)

  Select the amount of time that must pass before the system automatically logs you out.

Configuring the T3MB

You use the T3MB Configuration Menu to configure the T3 Main Board.

To open the T3MB Configuration Menu, select T3MB Configuration from the Node/T3MB Main Menu and press **Return**.

Figure 4-7 shows an example of the T3MB Configuration Menu.

```
DIGITAL LINK DL3100 REL 6.01.00 NODE    1:test          06/24/98 07:40:03
SELECTED DEVICE ADDRESS:    1.00.000  NAME: test                TYPE: NODE

T3MB CONFIGURATION    Exit  Confirm

DEVICE NAME:              test
SERVICE:                  In-Service          SCRAMBLER:  Disabled
HARDWARE REV:             D
FRAMING FORMAT:           C-bit Parity
LINE BUILD_OUT (LBO): Less than 225 ft
APPLICATIONS DATA LINK: NRZ
TRANSMIT CLOCK:           Internal
CURRENT TRANSMIT CLOCK:        Internal

ALARM THRESHOLDS             MAJOR         MINOR
BIPOLAR VIOLATIONS         1 x 10- 6     1 x 10- 4
P-BIT PARITY ERRORS        1 x 10- 6     1 x 10- 4
CP-BIT PARITY ERRORS       1 x 10- 6     1 x 10- 4
FRAME BIT ERRORS           1 x 10- 4     1 x 10- 4
```

Figure 4-7 T3MB Configuration Menu

T3MB Configuration Menu Parameters

The T3MB Configuration Menu allows you to set the following parameters:

- Device Name

  Enter an alphanumeric name of up to 20 characters (numbers, letters, and spaces are acceptable).

- Service—In Service or Out of Service (Default—In Service).

  Allows you to place the DL3100 in or out of service.

- Scrambler—Enabled or Disabled (Default—Disabled).

  When enabled, this feature scrambles the data signal before sending it to the network. The scrambler algorithm is based on the polynomial $x^{43}+ 1$.

NOTE: To use the scrambler, your main board must be Rev E or later.

- Hardware Rev

  This is a view-only field. The hardware rev is set at the factory and cannot be changed.

- Framing Format—C-bit Parity and M13 (Default —C-Bit Parity).

  Sets the framing format of the outgoing signal.

- Line Build-out—< 225 ft and > 225 ft (Default—< than 225 ft)

  This refers to the amount of WECO 728A cable (or equivalent) needed to reach the next DS3 device.

- Applications Data Link—NRZ (Non-Return to Zero) or NRZI (Non-Return to Zero Inverted. (Default—NRZI)

  Lets you insure the integrity of the network signal. This should be set to NRZI if the units at both ends of the T3 circuit support this feature. If one of the units does not have NRZI capability, the other unit must be set to NRZ.

- Transmit Clock—Internal, Network and External (Default—Internal).

  Designates the T3 Transmit Main Clock source.

  Internal—Causes the internal timing source of the DL3100 to generate the DS3 transmit timing. The receive timing is always recovered from the incoming DS3 signal.

  Network—Allows the recovered receive timing to clock the transmit signal (loop).

  External—Allows a customer-supplied External 1.544 MHz clock source to provide the DS3 clock. An External Clock BNC is provided on the back of the DL3100 for this purpose.

NOTE: If the network clock is lost, the unit will fall back to external clock. If there is no external clock, the unit will fall back to the internal clock. However, if the network clock or external clock becomes available and the unit is configured for one of these, then the unit reverts to the configured clock type.

- Current Transmit Clock—Internal, Network and External

  Read-only field. Indicates the current clock source. This field could be different from the Transmit Clock field if clock fallback occurs.

- T3MB Alarm Thresholds—Bipolar Violations, P-bit Parity Errors, CP-bit Parity Errors, and Frame Bit Errors

  Lets you set the major and minor T3MB Alarm Thresholds.

  You can change either the mantissa or the exponent of any of these thresholds. As you cursor down or to the right or left, the highlight bar will select only those elements in each threshold that are configurable. To change a mantissa or exponent, select it and type in the new value.

NOTE: Though the P-bit and C-bit Parity Error thresholds can be set through this screen, they are independent of the C-bit and P-bit parameters which activate the **PAR LED** on the DL3100. These are always set at 10-6, per Bellcore requirements.

If you set different thresholds for these parameters, it is possible to get two sets of C-bit or P-bit alarms. The **PAR LED** on the faceplate may activate (due to the Bellcore requirements), while simultaneously, alarms are generated (due to the customer set thresholds).

Configuring the T3MB TDL

You use the T3MB TDL Configuration Menu to provide a Terminal To Terminal Path Maintenance Data Link.

To open the T3MB TDL Configuration Menu, select T3MB TDL Configuration from the Node/T3MB Main Menu and press **Return**.

NOTE: When operating in C-bit framing format the menu will also display TDL messages, which are not displayed when operating in M13 framing format.

Figure 4-8 and Figure 4-9 show examples of each menu.

```
DIGITAL LINK DL3100 REL 6.01.00 NODE    1:test          06/24/98 07:47:49
SELECTED DEVICE ADDRESS:    1.00.000  NAME: test                TYPE: T3MB

T3MB TDL CONFIGURATION    Exit  Confirm  Repeat

EQUIPMENT IDENTIFICATION CODE:
LOCATION IDENTIFICATION CODE:
FRAME IDENTIFICATION CODE:
EQUIPMENT LOCATION IDENTIFICATION CODE:
FACILITY IDENTIFICATION CODE:
CONTENTS OF TDL MESSAGE RECEIVED
DATA PATH MESSAGE RECEIVED FROM DTE
EQUIPMENT IDENTIFICATION CODE:
LOCATION IDENTIFICATION CODE:
FRAME IDENTIFICATION CODE:
EQUIPMENT LOCATION IDENTIFICATION CODE:
FACILITY IDENTIFICATION CODE :
```

Figure 4-8 T3MB TDL Configuration Menu—C-bit Parity

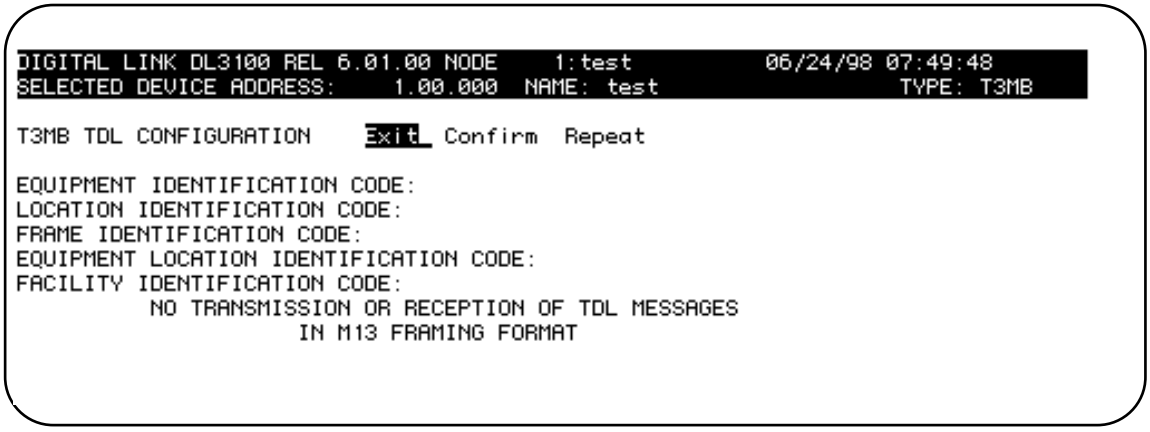

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 07:49:48
SELECTED DEVICE ADDRESS: 1.00.000 NAME: test TYPE: T3MB
T3MB TDL CONFIGURATION Exit Confirm Repeat
EQUIPMENT IDENTIFICATION CODE:
LOCATION IDENTIFICATION CODE:
FRAME IDENTIFICATION CODE:
EQUIPMENT LOCATION IDENTIFICATION CODE:
FACILITY IDENTIFICATION CODE:
NO TRANSMISSION OR RECEPTION OF TDL MESSAGES
IN M13 FRAMING FORMAT

Figure 4-9 T3MB TDL Configuration Menu—M13

T3MB TDL Configuration Menu Parameters

The T3MB TDL Configuration Menu allows you to set the following parameters:

- Equipment Identification Code

  Enter an alphanumeric name of up to 10 characters (numbers, letters, and spaces are acceptable), describing the node.

- Location Identification Code

  Enter an alphanumeric name of up to 11 characters, describing the location of the node.

- Frame Identification Code

  Enter an alphanumeric name of up to 10 characters, describing the equipment's location within a building.

- Equipment Location Identification Code

  Enter an alphanumeric name of up to six characters identifying the equipment's location within an equipment bay.

- Facility Identification Code

  Enter an alphanumeric name of up to 38 characters (numbers, letters, and spaces are acceptable) identifying the specific DS3 path.

- Contents of the TDL Message Received (C-bit Parity Format)

  The following parameters are view-only parameters and cannot be changed.

- Data Path (Idle or Test) Signal Received from DTE (Carrier)

  The TDL message received is either DATA PATH, IDLE or TEST, and was received from the DTE or the CARRIER.

- Equipment Identification Code

  Identifies the type of equipment sending the message.

- Location Identification Code

  Identifies the location of the unit sending the message.

- Frame Identification Code

  Identifies the equipment's location within a building at a given location.

- Equipment Location Identification Code

  Identifies the equipment's location within an equipment bay.

- Facility Identification Code

  Identifies the particular DS3 path involved in generating the message.

Configuring the HSDB and the HVDB

The HSDB and HVDB Main Menus contain a number of submenus that you use to configure, monitor, and manage the HSDB and HVDB.

To access the HSDB or HVDB Main Menu, select the HSDB or HVDB device from the Node/T3MB Main Menu.

Figure 4-10 shows an example of the HSDB Main Menu. The HVDB Main Menu looks exactly like the HSDB except for the title.

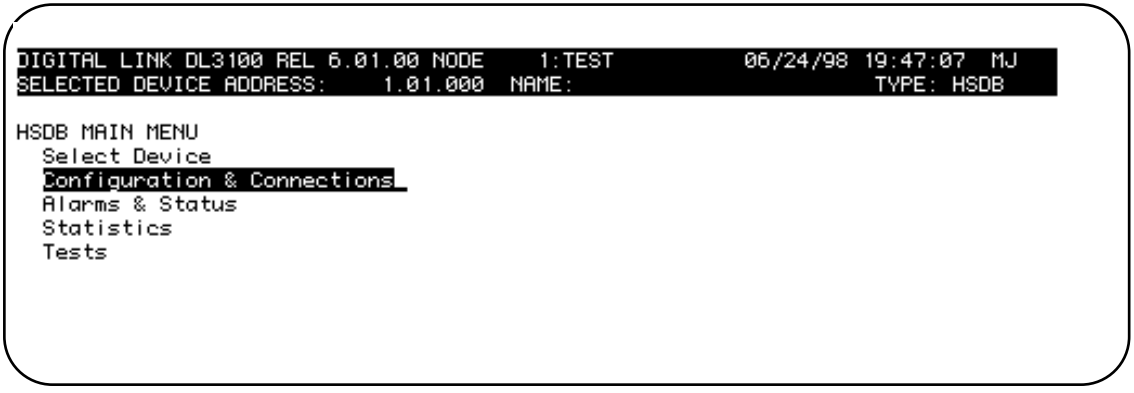


Figure 4-10 HSDB/HVDB Main Menu

HSDB and HVDB Main Menu Parameters

The HSDB and HVDB Main Menus allow you to set the following parameters:

- Select Device

  Lets you access any other main menu of any other board.

- Configuration & Connections

  Lets you configure the HSDB and HVDB. Because the parameters for the two types of DTE boards are different, a different Configuration & Connections Menu appears for each type of board.

- Alarms and Status

  Provides current alarm and status reports for the HSDB or HVDB.

- Statistics

  Provides current performance statistics for the T3MB module and allows you to reset the counters.

- Tests

  Lets you perform DTE and Network loopbacks.

Configuring the HSDB

You use the HSDB Configuration and Connections Menu to configure the HSDB.

To access the HSDB Configuration and Connections Menu, select the HSDB device from any main menu. Next select Configuration & Connections from the HSDB Main Menu and press **Return**.

Figure 4-11 shows an example of the HSDB Configuration and Connections Menu.

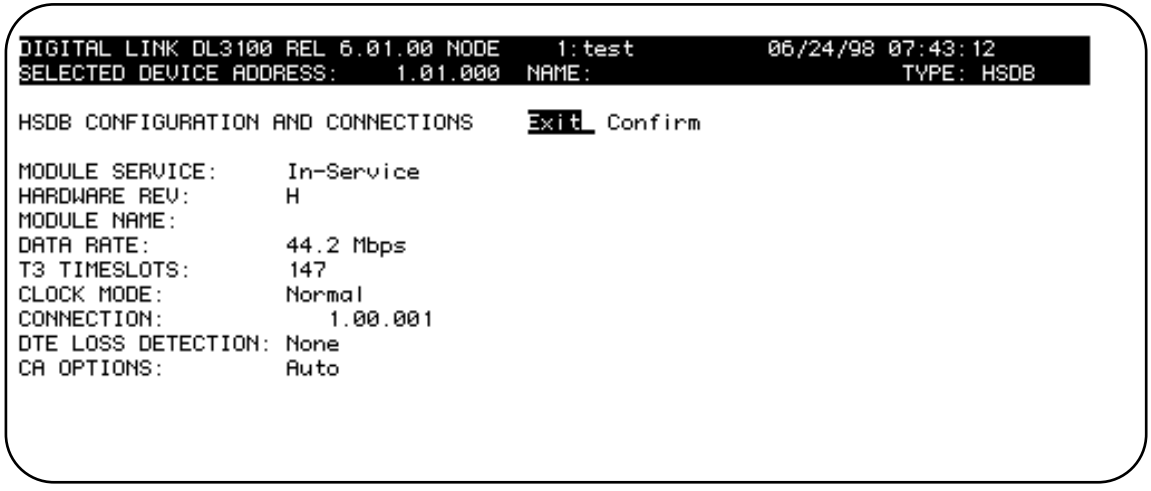

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 07:43:12
SELECTED DEVICE ADDRESS: 1.01.000 NAME: TYPE: HSDB
HSDB CONFIGURATION AND CONNECTIONS Exit Confirm
MODULE SERVICE: In-Service
HARDWARE REV: H
MODULE NAME:
DATA RATE: 44.2 Mbps
T3 TIMESLOTS: 147
CLOCK MODE: Normal
CONNECTION: 1.00.001
DTE LOSS DETECTION: None
CA OPTIONS: Auto

Figure 4-11 HSDB Configuration and Connections Menu

HSDB Configuration and Connections Menu Parameters

The HSDB Configuration and Connections Menu parameters are as follows:

- Module Service—In Service or Out of Service (Default—In Service).

  Allows you to place the HSDB in or out of service. Module Service affects the HSDB's ability to declare alarms. An HSDB that is out of service will not declare alarms.

- Hardware Rev

  This is a view–only field. The hardware rev is set at the factory and cannot be changed.

- Module Name

  Enter an alphanumeric name of up to 20 characters (numbers, letters, and spaces are acceptable).

- Data Rate

  This is a view-only field. The Data Rate changes automatically to correspond to the number of T3 slots selected (one timeslot is equal to approximately 300 kbps).

- T3 Timeslots

  Lets you allocate a certain number of T3 Timeslots on the main board to this particular HSDB.

  Enter the number of timeslots corresponding to the desired data rate (approximately 300 kbps per timeslot).

  There are a total of 147 timeslots available for DTE allocation. These timeslots will be shared by any modules physically connected to the T3MB.

- Clock Mode—Normal and Divided Clock (Default—Normal)

  The normal clock always runs in a bursty, or gapped mode at 50.2 Mbps.

  Divided clock is provided for devices that cannot run at normal clock rate. This option causes the 50.2 Mbps clock to divide repeatedly until it gets close to the actual DTE data rate.

- Connection

  The connection address automatically displays when bandwidth has been allocated to it.

- DTE Loss Detection—None or TA (Default—None)

  When the DTE loss detection is None, the DTE loss feature is disabled. If the DTE loss detection is set to TA (Terminal Available), and the TA lead is asserted, then the device is up. If the TA lead is not asserted, the DL3100 assumes the DTE device is down and cuts the RT clock to the DTE.

- CA Options—Auto, Assert, or Deassert (Default—Auto)

  Auto relates to the network. If the network is up, CA (Carrier Available) is on. If the network is down, CA is off. The conditions that reflect a down state are: RX AIS RX OOF RX LOS TX LOS TX yellow and RX yellow.

  Assert turns CA on regardless of the network state.

  Deassert turns CA off regardless of the network state.

Configuring the HVDB

You use the HVDB Configuration and Connections Menu to configure the HVDB.

To access the HVDB Configuration and Connections Menu, select the HVDB device from any main menu. Next select Configuration & Connections from the HVDB Main Menu and press **Return**.

Figure 4-12 shows an example of the HVDB Configuration and Connections Menu.

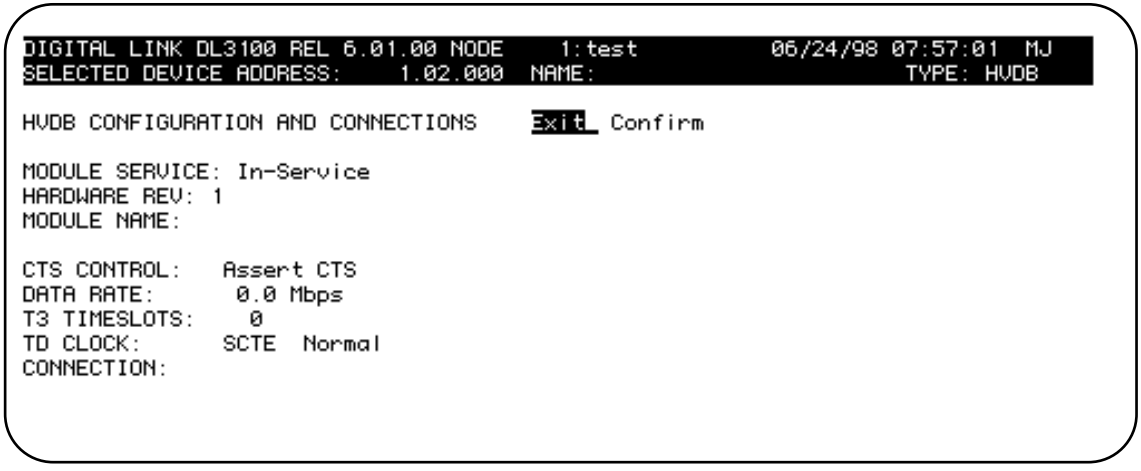

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 07:57:01 MJ
SELECTED DEVICE ADDRESS: 1.02.000 NAME: TYPE: HVDB
HVDB CONFIGURATION AND CONNECTIONS Exit Confirm
MODULE SERVICE: In-Service
HARDWARE REV: 1
MODULE NAME:
CTS CONTROL: Assert CTS
DATA RATE: 0.0 Mbps
T3 TIMESLOTS: 0
TD CLOCK: SCTE Normal
CONNECTION:

Figure 4-12 HVDB Configuration and Connections Menu

The HVDB configurable parameters are the same as those of the HSDB with the exceptions of CTS Control and TD Clock. These parameters are defined as follows:

HVDB Configuration and Connections Menu Parameters

The HVDB Configuration and Connections Menu parameters are as follows:

- CTS Control—Assert CTS or Auto CTS (Default—Assert CTS)

  Assert CTS—When this feature is enabled the CTS (clear to send) signal is always sent to the DTE regardless of the status of the RTS signal.

  Auto CTS—Select this mode to activate CTS when RTS is active and either a loop is in progress or the DTE is connected to the T3.

- Data Rate

  This is a view-only field. The Data Rate changes automatically to correspond to the number of T3 slots selected (one timeslot is equal to approximately 300 kbps).

- T3 Timeslots

  Lets you allocate a certain number of T3 Timeslots on the main board to this particular HVDB.

  Enter the number of timeslots corresponding to the desired data rate (approximately 300 kbps per timeslot).

  There are a total of 147 timeslots available for DTE allocation. These timeslots will be shared by any modules physically connected to the T3MB.

- TD Clock—SCT or SCTE; Normal or Invert

  Lets you determine whether the transmit clock is to be received from the DTE leads or from the DL3100. It also lets you set the clock to normal or inverted.

  SCT—Select SCT as the smooth clock from the DCE signal, if your DTE device does not support the SCTE signal.

  SCTE—Select SCTE as the smooth clock if your DTE device supports the SCTE signal. This setting is recommended for DTE clock speeds of > 4 Mbps or cable lengths of > 50 feet.

  NORMAL—Selects the standard transmit and receive V.35 clock mode.

  INVERT—Selects the inverted transmit and receive V.35 clock mode.

- Connection

  The connection address automatically displays when bandwidth has been allocated to it.

Configuring for SNMP Management

You use the SNMP Configuration Menu to configure the DL3100 for SNMP network management capability.

Once each unit has been assigned an IP address, you can connect an SNMP management station to the DL3100 NMS Network Manager (RS-232) port. The DL3100 uses the SLIP protocol to communicate with the SNMP management station.

To access the SNMP Configuration Menu, select SNMP Configuration from the Node/T3MB Main Menu.

Figure 4-13 shows an example of the SNMP Configuration Menu.

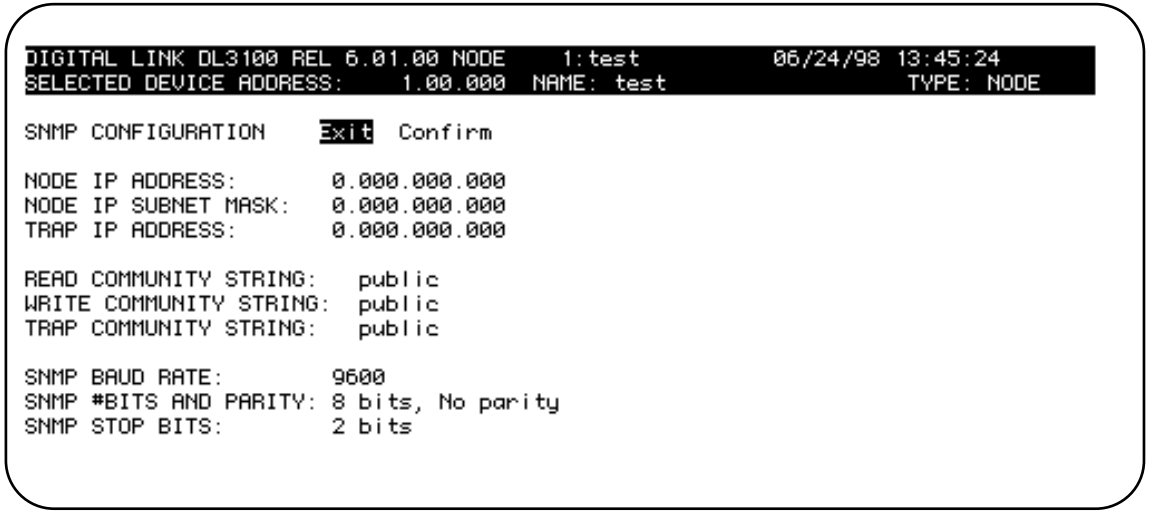

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 13:45:24
SELECTED DEVICE ADDRESS: 1.00.000 NAME: test TYPE: NODE
SNMP CONFIGURATION Exit Confirm
NODE IP ADDRESS: 0.000.000.000
NODE IP SUBNET MASK: 0.000.000.000
TRAP IP ADDRESS: 0.000.000.000
READ COMMUNITY STRING: public
WRITE COMMUNITY STRING: public
TRAP COMMUNITY STRING: public
SNMP BAUD RATE: 9600
SNMP #BITS AND PARITY: 8 bits, No parity
SNMP STOP BITS: 2 bits

Figure 4-13 SNMP Configuration Menu

SNMP Configuration Menu Parameters

The SNMP Configuration Menu parameters are:

- Node IP Address

  Enter the IP address of the node in the SNMP network. The SNMP management program uses this address to access information from the unit.

- Node IP Subnet Mask

  Enter the subnet mask of the node in the SNMP network. The mask indicates which bits in the IP address identify the physical network.

- Trap IP Address

  Enter the IP address of the SNMP workstation that will receive trap event messages from the DL3100.

- Read Community String (text string) (Default — public)

  Enter an alphanumeric text string (max—31 characters) that identifies a portion of the SNMP network that can read messages from the node.

- Write Community String (text string) (Default — public)

  Enter an alphanumeric text string (max—31 characters) that identifies a portion of the SNMP network that can write messages to the node.

- Trap Community String (text string) (Default — public)

  Enter an alphanumeric text string (max—31 characters) that identifies a portion of the SNMP network that can receive TRAP messages from the node.

- SNMP Baud Rate—300, 600, 1200, 2400, 4800, and 9600 (Default—9600)

  Select the SNMP workstation's baud rate.

- SNMP #Bits and Parity—8 bits; No parity, Even parity, or Odd Parity (Default—8 bits; No parity)

  Select the SNMP workstation's number of bits and parity.

- SNMP Stop Bits—1 bit, 1.5 bits, or 2 bits (Default—2 bits)

  Select the SNMP workstation's stop bits.

5 Monitoring and Managing the DL3100

When you log on to a DL3100, the Node/T3MB Main Menu appears on the terminal screen.

Figure 5-1 shows an example of the Node/T3MB Main Menu.

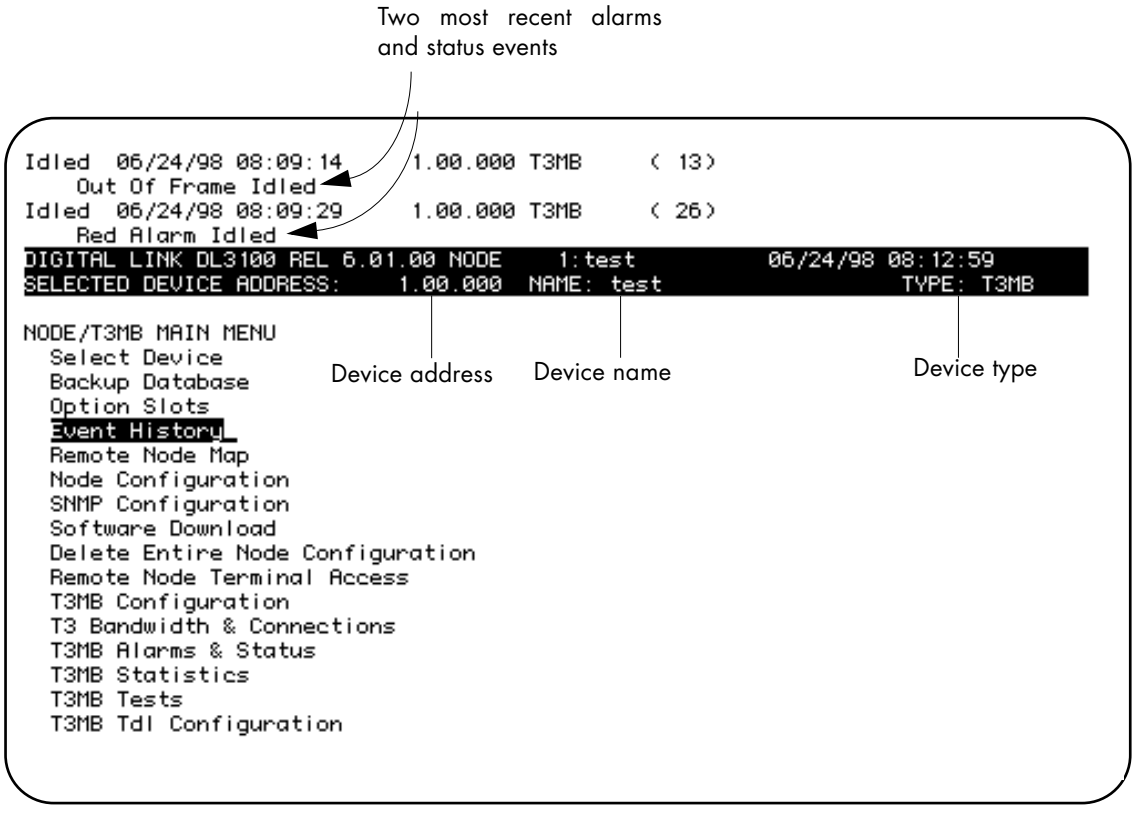


Figure 5-1 Node/T3MB Main Menu

To monitor and manage the DL3100, you access and use the following menus from the Node/T3MB Main Menu:

- Remote Node Terminal Access Menu
- Remote Node Map Menu

- Current T3 Alarms & Status Menu
- Current HSDB/HVDB Alarms & Status Menu
- Current T3MB Statistics Menu
- Current HSDB/HVDB Statistics Menu
- Event History Menu
- T3MB Bandwidth & Connections Menu

Managing the DL3100 also includes performing certain system utility functions, such as:

- Backing up the database
- Downloading software
- Deleting the node configuration

In this chapter you will learn how to manage and monitor the DL3100 using these menus and utilities.

You also use the LEDs on the DL3100 front panel to monitor and manage the system. The LEDs alert you to possible problems and provide a quick indication of unit and DTE status. For more information on LEDs, see Appendix A, *"DL3100 Technical Specifications."*

Node/T3MB Main Menu Selections

The Node/T3MB Main Menu offers the following selections:

- Select Device (Default—Local node address)

  Allows you to move to the main menu of the remote node or any DTE board.

  Enter the address of the device you wish to access.

- Backup Database

  Lets you manually backup the database to EEPROM.

- Option Slots

  Lets you designate which DTE boards occupy which DTE slots on the T3 main board.

- Event History

  Displays the DL3100's event history and lets you clear the event log.

- Remote Node Map

  Displays the number of the remote node and the status of the link (up or down).

- Node Configuration

  Lets you configure certain parameters of the DL3100.

- SNMP Configuration

  Lets you configure the DL3100 to communicate with an SNMP Management System.

- Delete Entire Node Configuration

  Lets you delete the node's configuration and return to the factory default settings.

- Remote Node Terminal Access

  Lets you log into the DL3100 or DL3000 on the other end of the T3.

- T3MB Configuration

  Lets you configure certain parameters on the T3MB.

- T3 Bandwidth and Connections

  Lets you allocate bandwidth and make connections on the T3MB and DTE boards.

- T3MB Alarms and Status

  Displays current alarm and status reports for the T3MB and DS3 signal.

- T3MB Statistics

  Displays current performance statistics of the T3MB and lets you clear the counters.

- T3MB Tests

  Lets you perform diagnostic loopbacks.

- T3MB TDL Configuration

  Lets you configure the Terminal Data Link.

Accessing the Remote Node Terminal

You can access the remote node terminal interface by the following steps:

1. **Select the Remote Node Terminal Access from the Node/T3MB Main Menu.**

2. **In the Remote Node Terminal Access Menu, enter the remote node number, and press `Return`.**

   You will be prompted to confirm.

3. **Select Confirm and press `Return`.**

When the remote unit is accessed, its name and address appear in the second line of the title bar of the Node/T3MB Main Menu (Figure 5-2).

NOTE: Local and remote nodes must have different node numbers.

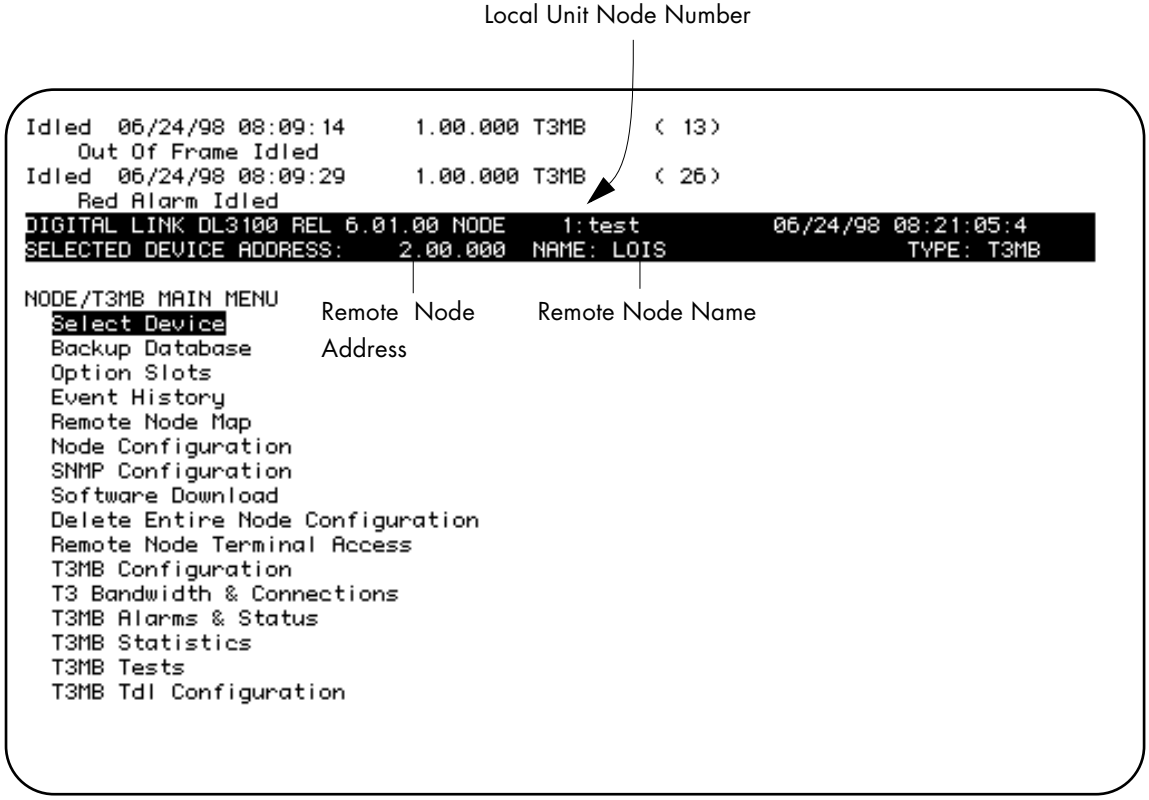


Figure 5-2 Remote Access of Node/T3MB Main Menu

Viewing the Status of the T3 Link

You use the Remote Node Map menu to view the status of the T3 link. This is a view only screen that displays the remote node address, the device type, and the status of the link (up or down).

To access the Remote Node Map (Figure 5-3), select it from the Node/T3MB Main Menu.

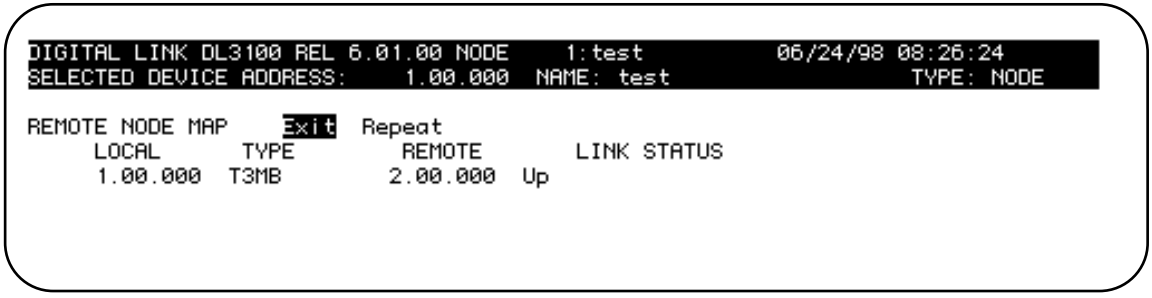

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 08:26:24
SELECTED DEVICE ADDRESS: 1.00.000 NAME: test TYPE: NODE
REMOTE NODE MAP Exit Repeat
LOCAL TYPE REMOTE LINK STATUS
1.00.000 T3MB 2.00.000 Up

Figure 5-3 Remote Node Map

Monitoring Alarms and Status

To monitor DL3100 alarms and status, you'll use the following submenus:

- Current T3MB Alarms and Status Menu
- Current HSDB Alarms and Status Items Menu
- Current HVDB Alarms and Status Items Menu

Monitoring Network Alarms and Status

The Current T3MB Alarms and Status Menu allows you to view the status of the T3 network.

NOTE: This is a view-only screen; you cannot make changes to it.

To access the Current T3MB Alarms and Status Menu, select T3MB Alarms and Status from the Node/T3MB Main Menu and press **Return**. The Current T3MB Alarms and Status Menu (Figure 5-4) will appear listing the type of each event defined by severity (status, major, minor, or idled).

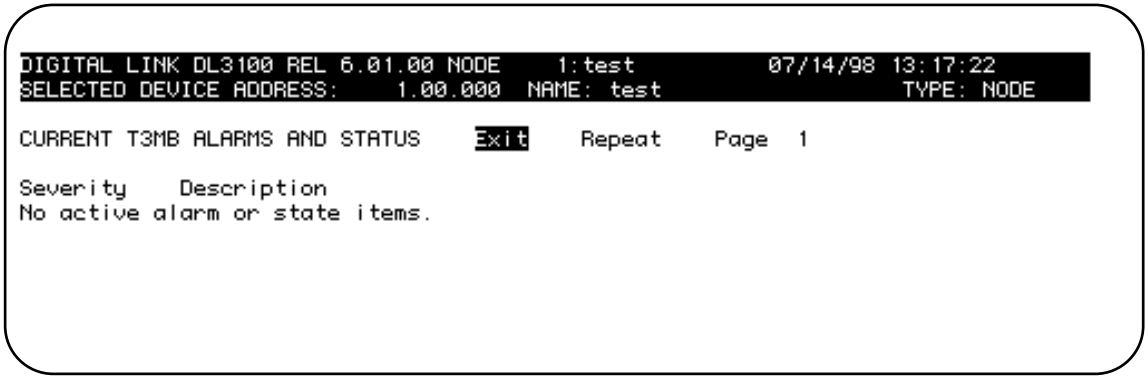

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 07/14/98 13:17:22
SELECTED DEVICE ADDRESS: 1.00.000 NAME: test TYPE: NODE
CURRENT T3MB ALARMS AND STATUS Exit Repeat Page 1
Severity Description
No active alarm or state items.

Figure 5-4 Current T3MB Alarm and Status Menu

To view additional pages with this same set of performance data, use the up and down arrows to scroll through the pages.

To update the Current T3MB Alarms and Status Menu, select Repeat and press **Return**.

Table 5-1 shows the T3MB alarm and status conditions.

Table 5-1 T3MB Alarms and Status Conditions

Message	Severity	Description
"No active alarm or state items."	Status	The DL3100 unit is operating correctly.
Battery Failed or Disabled	Minor	The battery is dead.
Loss of Signal	Status	The DL3100 unit detected loss of receive signal (LOS) on the DS3 interface. This alarm is also sent as a FEAC LOS signal to the remote unit.
Out of Frame	Status	The DL3100 unit detected an out-of-frame (OOF) occurrence on the DS3 interface. This alarm is also sent as a FEAC OOF signal to the remote unit.
AIS Alarm	Status	An alarm indication signal (AIS) has been received. This alarm also lights the "BLU" LED.
DTE Loopback	Status	Loopback has been activated to the DTE (payload) side of the DSU.
Network Loopback	Status	Loopback has been activated to the network T3 side of the DSU.

Table 5-1 T3MB Alarms and Status Conditions (Continued)

Message	Severity	Description
Red Alarm	Major	This is a logical OR of the LOS and OOF alarm. It is True if either of LOS or OOF is True. This alarm also illuminates the red LED.
Yellow Alarm	Major	This alarm is True if the yellow signal is received indicating failure on a remote device servicing the T3 data stream. This alarm also illuminates the yellow LED.
Idle Signal Detected	Status	The Idle signal is being received. It also sends DS3 Idle Received on the FEAC.
Failed Signal State Declared	Status	Ten consecutive seconds have been Severely Errored Seconds.
Excessive P-bit Parity BER	Minor	The bit error rate (BER) as calculated by the counted P-bit parity errors over a ten-minute interval exceeds the configured threshold.
FEAC LOS/HBER	Status	Far End Alarm and Control (FEAC) signal was received from remote equipment in the DS3 data stream indicating DS3 LOS/HBER.
FEAC Out of Frame	Status	Far End and Control (FEAC) signal was received from remote equipment in the DS3 data stream indicating that the DS3 is Out of Frame.
FEAC AIS Received	Status	Far End Alarm and Control (FEAC) signal was received from remote equipment in the DS3 data stream indicating DS3 AIS Received.
FEAC IDLE Received	Status	Far End Alarm and Control (FEAC) signal was received from remote equipment in the DS3 data stream indicating DS3 IDLE Received.
FEAC Equipment Failure (SA)	Status	Far End Alarm and Control (FEAC) signal was received from remote equipment in the DS3 data stream indicating DS3 Equipment Failure Service Affecting (SA).
FEAC Equipment Failure (NSA)	Status	Far End Alarm and Control (FEAC) signal from remote equipment in the DS3 data stream indicating DS3 Equipment Failure Not Service Affecting (NSA).

Table 5-1 T3MB Alarms and Status Conditions (Continued)

Message	Severity	Description
FEAC Common Equipment Failure	Status	Far End Alarm and Control (FEAC) signal was received from remote equipment in the DS3 data stream indicating DS3 Common Equipment Failure.
FEAC Line Loopback	Status	Far End Alarm and Control (FEAC) signal was received from remote equipment in the DS3 data stream indicating Line Loopback Activate, and that this message has been received at least ten times consecutively followed by the DS3 Line message.
BPV Minor Threshold Exceeded	Minor	The number of Bipolar Violations (BPVs) has exceeded the configured minor threshold value. A bipolar violation event is any bipolar violation on the T3 line which is not part of the normal B3ZS line coding.
BPV Major Threshold Exceeded	Major	The number Bipolar violations (BPVs) has exceeded the configured major threshold value.
FBE Minor Threshold Exceeded	Minor	The Frame Bit Error (FBE) count has exceeded the configured minor threshold value. An event is any frame bit that is in error.
FBE Major Threshold Exceeded	Major	The Frame Bit Error (FBE) count has exceeded the configured major threshold value.
PPE Minor Threshold Exceeded	Minor	The P-bit Parity Error (PPE) count has exceeded the configured minor threshold. An event is any frame for which one or both P-bits are incorrect.
PPE Major Threshold Exceeded	Major	The P-bit Parity Error (PPE) count has exceeded the configured major threshold.
CPPE Minor Threshold Exceeded	Minor	The CP-bit Parity Error (CPPE) count has exceeded the configured minor threshold. An event is any frame from which one or both CP-bits are incorrect.
CPPE Major Threshold Exceeded	Major	The CP-bit Parity Error (CPPE) count has exceeded the configured major threshold.
Transmit Signal Loss Detected	Major	The DL3100 detected a loss of the transmit signal.

Table 5-1 T3MB Alarms and Status Conditions (Continued)

Message	Severity	Description
RAM Test Failed	Minor	The RAM test failed during DL3100 initialization.
ROM Checksum Failed	Minor	The ROM checksum failed during DL3100 initialization.
Processor Restart	Status	The DL3100 unit has been reset.
External Alarm Input Active	Status	External alarm input relay is active.
Excessive Temperature	Minor	The temperature sensor indicates the DL3100 chassis is "too hot." This could be caused by a failure of the cooling fan, blockage of cooling vents, or poor site selection when the unit was installed. The unit is designed to operate at ≤ 50°C.

Monitoring HSDB and HVDB Alarms and Status

You use the Current HSDB Alarms & Status Items Menu and the Current HVDB Alarms & Status Items Menu to view HSDB and HVDB alarm and status items.

NOTE: These are view-only screens; you cannot make changes to them.

To access these screens, you must first select the HSDB or HVDB device from any main menu. Then, from the HSDB or HVDB Main Menu, select Alarms & Status and press **`Return`**. Examples of both Alarms & Status menus are shown in Figure 5-5 and Figure 5-6.

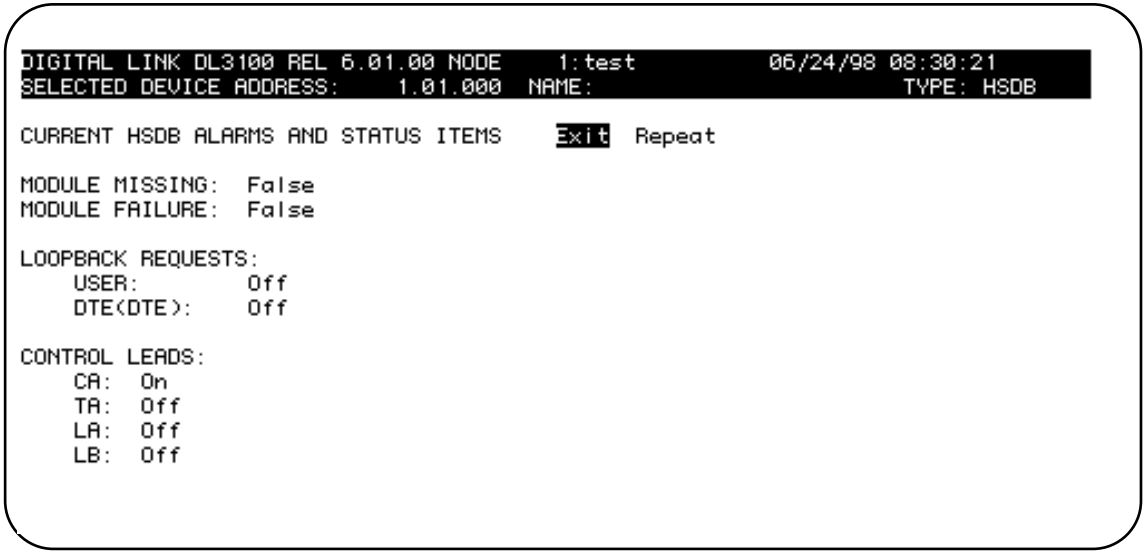


Figure 5-5 Current HSDB Alarms and Status Items Menu

Current HSDB Alarms and Status Items Menu Parameters

The Current HSDB Alarms and Status Items Menu parameters are as follows:

- Module Missing—True or False

  True indicates that there is no HSSI interface installed.

  False indicates that there is a HSSI interface installed.

- Module Failure—True or False

  True indicates that the HSSI interface is not functioning properly.

  False indicates that the HSSI interface is functioning properly.

- Loopback Requests:

  User—On or Off

  On indicates that a loopback test was requested by the user.

  DTE (DTE)—On or Off

  On indicates that a loopback test was requested by the DTE providing the LA or LB signal on the interface.

- CA (data Communications equipment Available)

  On indicates that the DL3100 DSU is prepared to send and receive data.

- TA (data Terminal equipment Available)

  On indicates that the DTE is prepared to send and receive data.

- LA (Loopback Circuit A)

  This signal is provided to the DL3100 from the DTE.

  On indicates that the DTE is requesting a loopback.

- LB (Loopback Circuit B)

  This signal is provided to the DL3100 from the DTE.

  On indicates that the DTE is requesting a loopback.

  The LA and LB signals combine to provide one of three diagnostic loopback modes:

  LB=0, LA=0 no loopback

  LB=1, LA=1 local DTE loopback

  LB=0, LA=1 local line loopback

  LB=1, LA=0 remote line loopback

  A “1” indicates activation of the signal, and a “0” indicates deactivation of the signal.

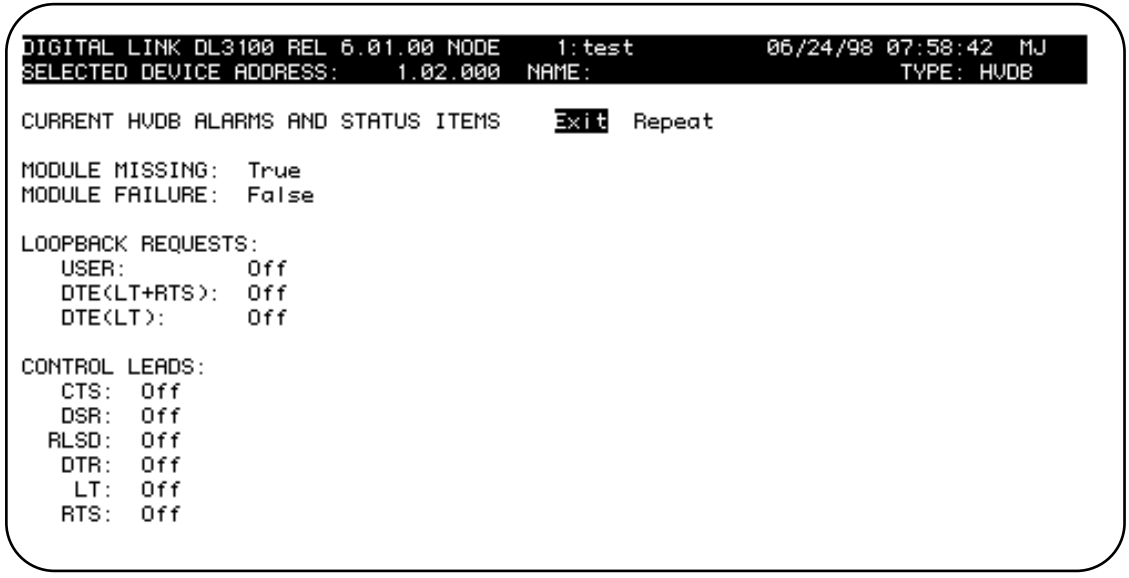


Figure 5-6 Current HVDB Alarms and Status Items Menu

Current HVDB Alarms and Status Items Menu Parameters

The Current HVDB Alarms and Status Items Menu parameters are:

- Module Missing—True or False

  True indicates that there is no V.35 interface installed.

  False indicates that there is a V.35 interface installed.

- Module Failure—True or False

  True indicates that the V.35 interface is not functioning properly.

  False indicates that the V.35 interface is functioning properly.

- Loopback Requests

  DTE (LT+RTS)—On or Off

  On indicates that the customer equipment (DTE) has requested a loopback test when both RTS and LT are On.

  DTE (LT)—On or Off

  On indicates that the customer equipment (DTE) has requested test mode, and is the DTE providing the LT and DTR signal without RTS.

  This test enables the DTE loopback circuit without the DTE being ready to send data.

  CTS (Clear to Send)—On or Off

  On indicates that the DL3100 is ready to accept data from the DTE.

  DSR (Data Set Ready)—On or Off

  On indicates that the DL3100 is ready to accept data from the DTE.

  RLSD (Receive Line Signal Detector)—On or Off

  On indicates:

  - The receive data is reliable
  - The T3 data is in frame sync
  - The DL3100 is receiving good framing information

  DTR (Data Terminal Ready)—On or Off

  On indicates that the DTE is ready to accept data.

  LT (Local Test)—On or Off

  On indicates that the DTE is requesting local loopback or test mode at the DL3100 interface.

  RTS (Request to Send)—On or Off

  On indicates that the DTE is ready to send data.

Monitoring Statistics

To monitor DL3100 statistics, you'll use the following submenus:

- Current T3MB Statistics Menu
- Current HSDB Statistics Menu
- Current HVDB Statistics Menu

Monitoring Network Statistics

The Current T3MB Statistics Menu allows you to view the network statistics, as well as clear the menu display and reset the counters.

Two separate screens display both current and cumulative data. Current data is defined as the number of errors occurring in the current 15-minute interval. Cumulative data is defined as the number of errors occurring over the past 24 hours, in 15-minute intervals (including the current interval).

NOTE: If the counters have been reset in the past 24 hours, the display will only show those occurrences since the last reset.

To access the Current T3MB Statistics Menu, select T3MB Statistics from the Node/T3MB Main Menu. Examples of the two Current T3MB Statistics Menu screens are shown in Figure 5-7 on page 5-14 and Figure 5-8 on page 5-15.

```
DIGITAL LINK DL3100 REL 6.01.00 NODE    1:test          06/24/98 08:38:54
SELECTED DEVICE ADDRESS:    1.00.000  NAME: test                TYPE: T3MB

CURRENT T3MB STATISTICS    Exit  Next  Repeat  Clear        Page  1

CURRENT SECONDS: 796     PAST INTERVALS:  0     ERROR-FREE SECONDS:  99.8%

                    ES          FS          SES         OOF         LOS         AIS
CURRENT              1           0           1           1           0           0
ERR RATE           N/A         N/A         N/A         N/A         N/A         N/A

CUMULATIVE           1           0           1           1           0           0
ERR RATE           N/A         N/A         N/A         N/A         N/A         N/A
```

Figure 5-7 Current T3MB Statistics Menu - Screen 1

To view additional pages with this same set of performance data, use the up and down arrows (as appropriate) to scroll through the pages.

To view a different set of statistics, select Next and press **Return**. Use the down arrow to scroll through additional pages with the same set of statistics.

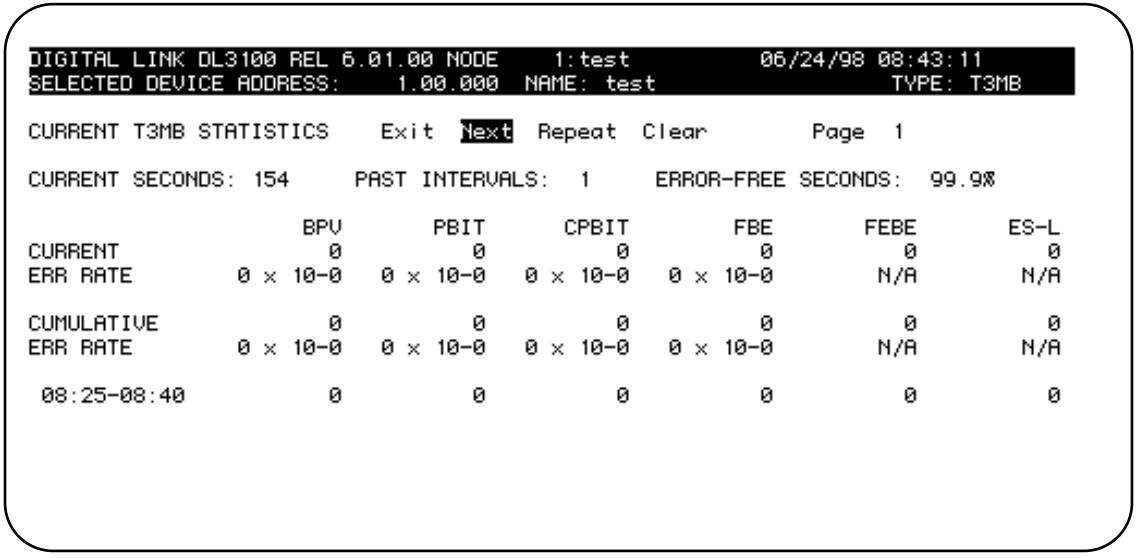

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 08:43:11
SELECTED DEVICE ADDRESS: 1.00.000 NAME: test TYPE: T3MB
CURRENT T3MB STATISTICS Exit Next Repeat Clear Page 1
CURRENT SECONDS: 154 PAST INTERVALS: 1 ERROR-FREE SECONDS: 99.9%
BPV PBIT CPBIT FBE FEBE ES-L
CURRENT 0 0 0 0 0 0
ERR RATE 0 x 10-0 0 x 10-0 0 x 10-0 0 x 10-0 N/A N/A
CUMULATIVE 0 0 0 0 0 0
ERR RATE 0 x 10-0 0 x 10-0 0 x 10-0 0 x 10-0 N/A N/A
08:25-08:40 0 0 0 0 0 0

Figure 5-8 Current T3MB Statistics Menu - Screen 2

T3MB Statistics Parameters

The T3MB Statistics parameters are as follows:

- ES (Errored Seconds)

  OOF is no longer included in errored seconds (ES). An Errored Second is the number of seconds containing at least one P-bit parity or other errors such as CP-bit or AIS.

- FS (Failed Seconds)

  A Failed Second is the number of seconds after the occurrence of ten consecutive Severely Errored Seconds (SESs).

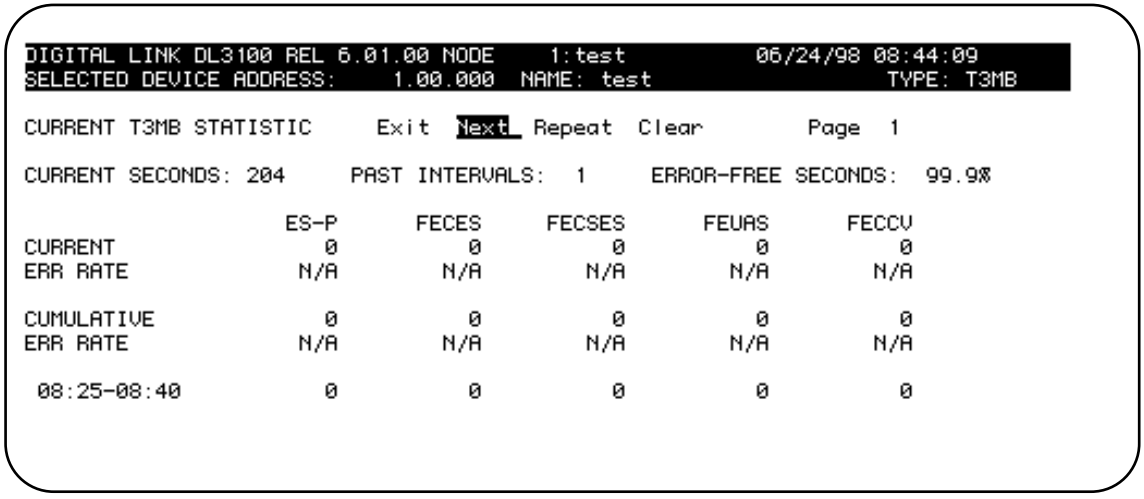

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 08:44:09
SELECTED DEVICE ADDRESS: 1.00.000 NAME: test TYPE: T3MB
CURRENT T3MB STATISTIC Exit Next Repeat Clear Page 1
CURRENT SECONDS: 204 PAST INTERVALS: 1 ERROR-FREE SECONDS: 99.9%
ES-P FECES FECSES FEUAS FECCV
CURRENT 0 0 0 0 0
ERR RATE N/A N/A N/A N/A N/A
CUMULATIVE 0 0 0 0 0
ERR RATE N/A N/A N/A N/A N/A
08:25-08:40 0 0 0 0 0

Figure 5-9 Current T3MB Statistics Menu - Screen 3

- SES (Severely Errored Second)

  A Severely Errored Second is a second containing 44 or more CPbit, AIS, or OOF events.

- OOF (Out Of Frame)

  An Out Of Frame Second is the number of seconds that the signal has been out of frame.

- LOS (Loss of Signal)

  A Loss Of Signal is the number of seconds in which there has been at least one (LOS) event.

- AIS (Alarm Indication Signal)

  An Alarm Indication Signal is the number of seconds in which an alarm condition exists in the network.

- BPV (Bipolar Violations)

  A Bipolar Violation is the occurrence of two consecutive “ones” bits of the same polarity, or an excessive zero (EXZ) event.

- P-BIT

  P-Bit indicates the total number of P-Bit Parity Errors that have occurred during the current interval and over the last 24 hours.

- CP-BIT

  CP-Bit indicates the total number of CP-Bit Parity Errors that have occurred during the current interval and over the last 24 hours.

- FBE (Framing Bit Error)

  A Framing Bit Error (also known as FE) is the occurrence of an error in the F- or M-bit position of the DS3 frame.

- FEBE (Far End Block Error)

  FEBE indicates the total number of Far End Block Errors that have occurred during the current interval and over the last 24 hours.

- ES-L (Errored Seconds-Line)

  This is the number of seconds containing at least one BPV.

- ES-P (Errored Seconds-Parity)

  This is the number of seconds containing at least one P-bit parity or CP-bit parity error.

- FECES (Far End CESs)

  Far End CESs is the number of Far End C-bit Errored Seconds encountered by a DS3 interface.

- FECSES (Far End CSESs)

  Far End CSESs is the number of Far End C-bit Severely Errored Seconds encountered by a DS3 interface.

- FEUAS (Far End UASs)

  Far End UASs is the number of Far End unavailable seconds encountered by a DS3 interface.

- FECCV (Far End CCVs)

  Far End CCVs is the number of Far End C-bit Coding Violations reported via the far end block error count encountered by a DS3 interface.

Comparison of RFC 1407 and the DL3100 Statistics Menu

Table 5-2 compares RFC 1407 to the DL3100 Statistics Menu.

Table 5-2 Statistics Menu Comparisons

RFC 1407 Statistics	DL3100 Statistics Menu Equivalent
PES - P-bit Errored Seconds	AIS, OOF, P-BIT, ES-P
PSES - P-bit Severely Errored Seconds	AIS, OOF, P-BIT, ES-P
SEFS - Severely Errored Framing Seconds	AIS, OFF, SES
UAS - Unavailable Seconds	ES-L, ES
LES - Line Errored Seconds	ES-L
CES - C-bit Severely Errored Seconds	ES-P
LCV - Line Code Violations	BPV (this includes EXZ)
PCV - P-bit Coding Violation	P-BIT
CCV - C-bit Coding Violations	CP-BIT

Notes on RFC1407 MIB far end statistics support

The RFC1407 MIB module contains three groups:

- DS3/E3 Near End Group (mandatory),
- DS3 Far End Group (optional), and
- DS3 Fractional Group (optional).

The DS3 Far End Group is a new group. This group contains configuration information and statistics that are collected from the far end DS3/E3 interface. Presently, the Far End Group may only be implemented by DS3 systems that use C-bit Parity or SYNTRAN.

The DS3 Far End statistics are various statistics collected from the far end block error code within the C-bits.

RFC 1407 Statistics Descriptions

Table 5-3 describes the statistics for RFC 1407.

Table 5-3 RFC 1407 Statistics Detail

Statistic Type	Description
P-bit Errored Seconds (PES)	A PES is an occurrence of one or more PCVs, one or more OOFs, or detection of an incoming AIS within a 1-second time frame. This gauge is not incremented when UASs are counted.
P-bit Severely Errored Seconds (PSES)	A PSES is an occurrence of 44 or more PCVs, or one or more OOFs, or detection of an incoming AIS within a 1-second time frame. This gauge is not incremented when UASs are counted
Severely Errored Framing Seconds (SEFS)	A SEFS is an occurrence of one or more OOFs, or detection of an incoming AIS within a 1-second time frame.
Unavailable Seconds (UAS)	Number of seconds that the interface is unavailable. The DS3 interface becomes unavailable at either the onset of 10 contiguous PSESs or the condition leading to a failure (see Failure States). If the condition leading to the failure is immediately preceded by one or more contiguous PSESs, then the DS3 interface unavailability starts from the onset of these PSESs. Once unavailable, and if no failure is present, the DS3 interface becomes available at the onset of 10 contiguous seconds with no PSESs. Once unavailable, and if a failure is present, the DS3 interface becomes available at the onset of 10 contiguous seconds with no PSESs, if the failure clearing time is less than or equal to 10 seconds. If the failure clearing time is more than 10 seconds, the DS3 interface becomes available at the onset of 10 contiguous seconds with no PSESs, or the onset period leading to the successful clearing condition, whichever occurs later. With respect to the DS3 error counts, all counters are incremented while the DS3 interface is deemed available. While the interface is deemed unavailable, the only count that is incremented is UASs. A special case exists when a period of 10 seconds or greater crosses the 900 second statistics window boundary, as the foregoing description implies that the PSES and UAS counters must be adjusted when the Unavailable Signal State is entered. Clearly, successive *gets* of the affected dsx3IntervalPSESs and dsx3IntervalUASs objects will return differing values if the first *get* occurs during the first few seconds of the window. This is viewed as an unavoidable side-effect of selecting the presently defined managed objects as a basis for this memo.

Table 5-3 RFC 1407 Statistics Detail (Continued)

Statistic Type	Description
Line Errored Seconds (LES)	A Line Errored Second is an occurrence of one or more CVs or one or more LOS defects within a 1-second time frame.
C-bit Errored Seconds (CES)	An CES is an occurrence of one or more CCVs, one or more OOFs, or detection of an incoming AIS within a 1-second time frame. This count is only for the SYNTRAN and C-bit Parity DS3 applications. This gauge is not incremented when UASs are counted.
C-bit Severely Errored Seconds (CSES)	A CSES is an occurrence of 44 or more CCVs, or one or more OOFs, or detection of an incoming AIS within a 1-second time frame. This count is only for the SYNTRAN and C-bit Parity DS3 applications. This gauge is not incremented when UASs are counted.
Line Coding Violation (LCV) Error Event	This parameter is a count of both BPVs and EXZs that occur within an accumulation period. An EXZ increments the LCV by one regardless of the length of the zero string.
P-bit Coding Violation (PCV) Error Event	For all DS3 applications, a coding violation error event is a P-bit Parity Error event. A P-bit Parity Error event is the occurrence of a received P-bit code on the DS3 M-frame that is not identical to the corresponding locally-calculated code.
C-bit Coding Violation (CCV) Error Event	For C-bit Parity and SYNTRAN DS3 applications, this is the count of coding violations reported via the C-bits. For C-bit Parity, it is a count of CP-bit parity errors occurring in the accumulation interval. For SYNTRAN, it is a count of CRC-9 errors occurring in the accumulation interval.

Monitoring HSDB and HVDB Statistics

The Current HSDB Statistics and the Current HVDB Statistics Menus allow you to view the current HSDB and HVDB performance statistics. From these menus you can clear the menu display and reset the counters.

Two separate screens display both current and cumulative data. Current data is defined as the number of errors occurring in the current 15-minute interval. Cumulative data is defined as the number of errors occurring over the past 96 hours, in 15-minute intervals (including the current interval).

NOTE: If the counters have been reset in the past 24 hours, the display will only show those occurrences since the last reset.

To access the Current HSDB Statistics Menu, select the HSDB device from any of the main menus. Then select Statistics from the HSDB Main Menu. Follow the same procedure for the HVDB device.

The Current HSDB and Current HVDB Statistics Menus look exactly the same except for the menu name. Figure 5-10 shows an example of the Current HSDB Statistics Menu.

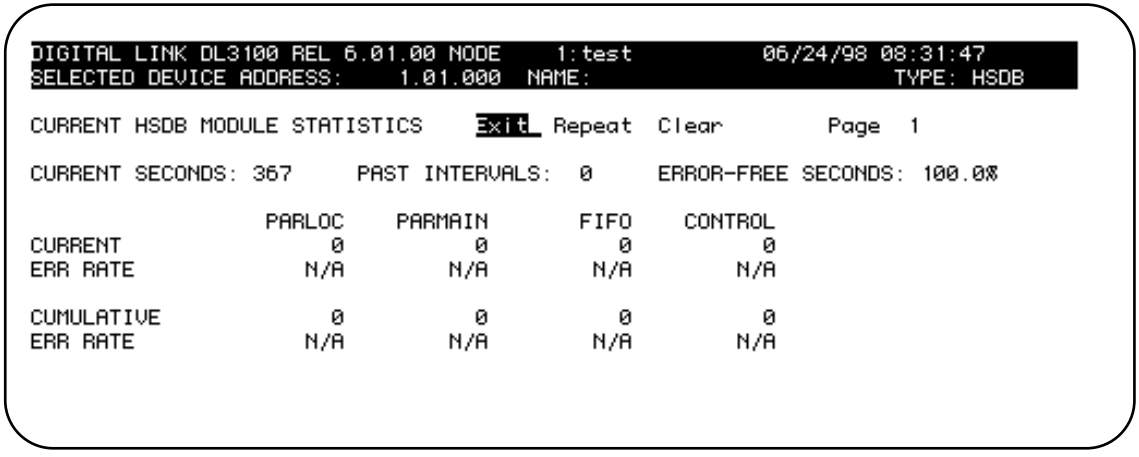

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 08:31:47
SELECTED DEVICE ADDRESS: 1.01.000 NAME: TYPE: HSDB
CURRENT HSDB MODULE STATISTICS Exit Repeat Clear Page 1
CURRENT SECONDS: 367 PAST INTERVALS: 0 ERROR-FREE SECONDS: 100.0%
PARLOC PARMAIN FIFO CONTROL
CURRENT 0 0 0 0
ERR RATE N/A N/A N/A N/A
CUMULATIVE 0 0 0 0
ERR RATE N/A N/A N/A N/A

Figure 5-10 Current HSDB Statistics Menu

To view additional pages with this same set of performance data, use the up and down arrows (as appropriate) to scroll through the pages.

To update the Current HSDB and HVDB Statistics menus, select Repeat and press **Return**.

HSDB and HVDB Statistics Parameters

NOTE: For HSDB and HVDB statistics, current data represents the current 15-minute interval. Cumulative data is defined as the number of errors occurring over the past 24 hours, in 15-minute intervals (including the current interval).

The HSDB and HVDB Statistics parameters are as follows:

- Parloc

  DTE Parity Lock (Parloc) is the number of seconds during which a parity error was detected on traffic from the T3MB to the DTE board.

- Parmain

  DTE Parity Main (Parmain) is the number of seconds during which a parity error was detected on traffic from the DTE board to the network.

- FIFO

  FIFO is the number of times the First-In First-Out bit has locked up during the current interval and in the last 24 hours.

- Control

  Control is the number of times that the DTE board has failed to respond correctly to a message from the controller processor.

Displaying the Event History

You use the Event History Menu to review and clear the alarm and status history of the DL3100 and all its boards.

To open the menu, select Event History from the Node/T3MB Main Menu and press **Return**.

To clear the event history report in the Event History Menu, select Clear History and press **Return**.

Use the up and down arrows to cursor through additional pages of the Event History report.

Figure 5-11 shows an example of the Event History screen.

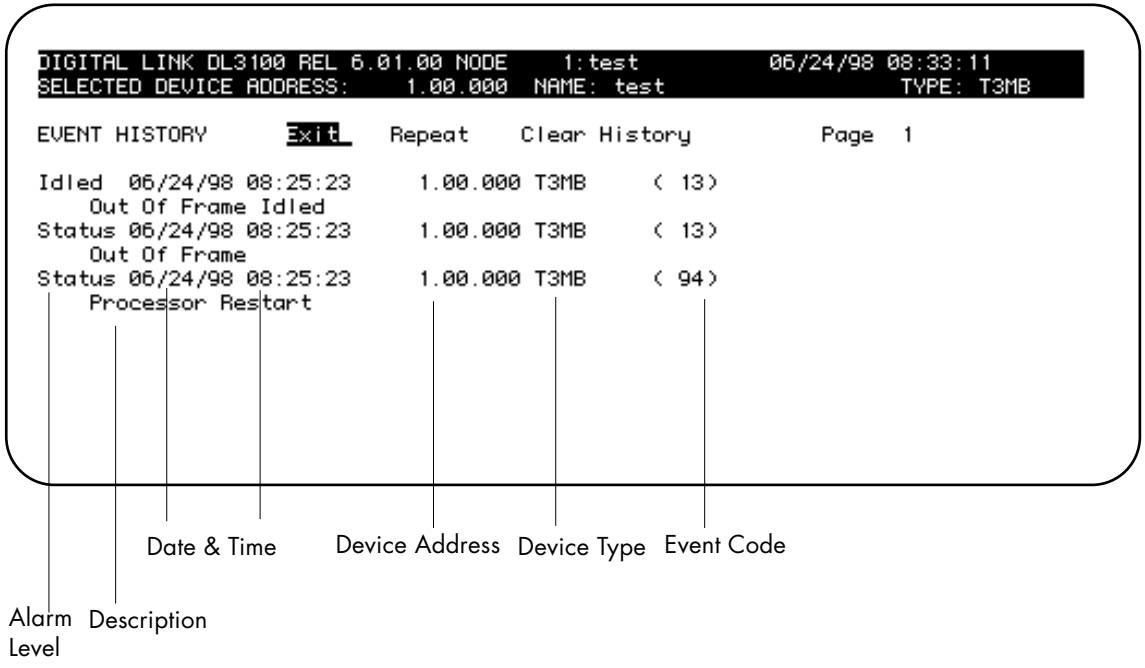

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 08:33:11
SELECTED DEVICE ADDRESS: 1.00.000 NAME: test TYPE: T3MB
EVENT HISTORY Exit Repeat Clear History Page 1
Idled 06/24/98 08:25:23 1.00.000 T3MB (13)
Out Of Frame Idled
Status 06/24/98 08:25:23 1.00.000 T3MB (13)
Out Of Frame
Status 06/24/98 08:25:23 1.00.000 T3MB (94)
Processor Restart
Date & Time
Device Address
Device Type
Event Code
Alarm Level
Description

Figure 5-11 Event History Screen

Event History Menu Parameters

The Event History Menu parameters are as follows:

- Alarm Level

  Major—Affects service

  Minor—Requires attention, but is not yet affecting service

  Idled—Alarm condition has expired

  Status—No affect on service

- Date & Time

  Date and time of the occurrence or expiration of the alarm/state.

- Device

  The address (node address) and type (T3MB, HSDB, HVDB) of the device reporting the status and alarm condition.

- Event Code

  Number designation for type of alarm or status condition.

- Description

  Describes the event.

Monitoring T3MB Bandwidth and Connections

The T3MB Bandwidth & Connections Menu displays the amount of bandwidth allocated to each DTE board, as well as the total bandwidth currently in use.

NOTE: This is a view-only menu. You cannot allocate bandwidth using this menu. To allocate bandwidth, select T3 Timeslots from the HSDB/HVDB Configuration and Connections Menu. For information on bandwidth, see "Configuring the HSDB and the HVDB" on page 4-21 in Chapter 4, *"Configuring the DL3100."*

To access the T3MB Bandwidth & Connections Menu (Figure 5-12), select T3 Bandwidth & Connections from the Node/T3MB Main Menu and press **`Return`**.

```
DIGITAL LINK DL3100 REL 6.01.00 NODE    1:test          06/24/98 08:34:02
SELECTED DEVICE ADDRESS:    1.00.000  NAME: test                TYPE: T3MB

T3MB BANDWIDTH & CONNECTIONS    Exit                              Page  1
BANDWIDTH USAGE:  100.0%
CHAN #TS   EQUIV      STATE          CONNECTION
  1  147  44.2 Mbps  Allocated        1.01.000
```

Figure 5-12 T3MB Bandwidth & Connections Menu

Using the System Utilities

In this section you will learn to perform the following system utilities:

- Delete the entire node configuration
- Download software
- Backup the database

Each of these utilities is accessible from the Node/T3MB Main Menu.

Downloading Software

The Software Download command is used to upgrade the software on the local DL3100. To access this function, select Software Download from the Node/T3MB Main Menu.

Before you download software, make sure you have the following:

- An IBM PC (or compatible) with hard disk drive—for its MS DOS binary file reading capability.
- A terminal emulation program with a VT-100 or ANSI emulation and Xmodem or Kermit binary transfer capability. Example— Procomm, Mirror or Xtalk.
- An RS-232 connection between PC and DL3100—Does not require a null modem since the DE-9 (terminal) connector is pinned-out on the DL3100. DE-9 to DB-25 adaptors may be required, depending on the PC.

We also recommend that you:

- Disable XON/XOFF flow control from the Node Configuration Menu.
- Disable Multidrop Mode from the Node Configuration Menu.

Figure 5-13 shows an example of the Software Download Menu.

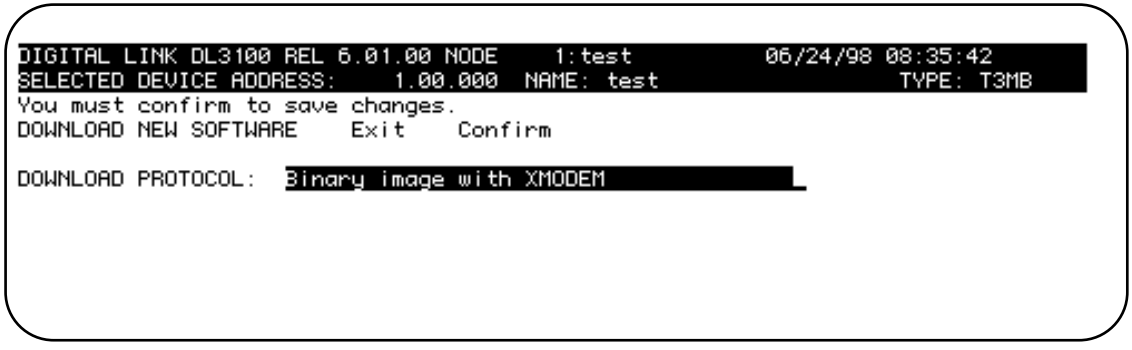

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 08:35:42
SELECTED DEVICE ADDRESS: 1.00.000 NAME: test TYPE: T3MB
You must confirm to save changes.
DOWNLOAD NEW SOFTWARE Exit Confirm
DOWNLOAD PROTOCOL: Binary image with XMODEM

Figure 5-13 Software Download Menu

To download new software:

1. **Copy the software file onto the PC hard drive.**

2. **Execute the emulation program on the PC and set it up to match the DL3100 comm port settings.**

3. **To begin downloading, you must be logged on to the selected DL3100.**

   Select Software Download from the Node/T3MB Main Menu.

   To refresh the screen, use **`Ctrl-L`**.

4. **To select the download mode, highlight the Download Protocol field and use the Space Bar to cycle through the options. Press `Return` at the desired option.**

   The options are Binary image with Kermit, Binary image with XMODEM, Motorola S-Records with ASCII Transfer, and None.

   A message appears reminding you that you must confirm the change.

5. **Select Confirm and press `Return`.**

6. **Start the download from the emulation program.**

   This can take up to 20 minutes at a 9600 baud rate. When it is completed, the DL3100 automatically reboots.

You may need to perform the download again if any communications errors are encountered. To find out if the download has been successful, log into the DL3100 and check the software revision number. If the software revision number has been updated, the download is complete.

Deleting the Entire Node Configuration

You can perform three tasks from the Delete Entire Node Configuration Menu:

- Delete RAM Code and Revert to ROM Code

  This operation deletes any software downloaded to the unit. The unit reverts to the initial software it received at the factory.

NOTE: The DL3100 configuration may be lost during this operation.

- Restart Node Software

  This operation is equivalent to turning the power on and off. The last saved database remains unchanged.

- Reset Entire Node Database to Factory Defaults

  This operation resets the unit's database to its original factory settings.

WARNING: Perform the Delete Entire Node Configuration task with great caution. It may interrupt service and adversely affect service.

To perform any of these tasks:

1. **In the Desired Action field, cycle through the three tasks using the Space Bar. Press `Return` to select the task.**

   The system sends you a warning message:

   ```
   DO YOU REALLY WANT TO DO THIS?  PLEASE CONFIRM:
   ```

2. **If you are sure you want to do this, select Confirm (or select Exit to cancel).**

Figure 5-14 shows Reset Entire Node Database to Factory Defaults selected in the Delete Entire Unit Configuration Menu.

```
DIGITAL LINK DL3100 REL 6.01.00 NODE    1:test          06/24/98 08:36:53
SELECTED DEVICE ADDRESS:    1.00.000  NAME: test                TYPE: T3MB
You must confirm to save changes.
DELETE ENTIRE NODE CONFIGURATION    Exit

DESIRED ACTION:  Reset Entire Node Database to Factory Defaults


          DO YOU REALLY WANT TO DO THIS?  PLEASE CONFIRM:

                          Confirm
```

Figure 5-14 Delete Entire Node Configuration Menu

Backing Up the Database

To manually backup the database to the EEPROM, select Backup Database from the Node/T3MB Main Menu and press **`Return`**. The following message will display indicating that the backup is complete:

```
Database backed up to EEPROM.
```

To cause the DL3100 to perform automatic backups after each confirmed change, select an Automatic Backup option in the Node Configuration Menu. For more information, see "Configuring the Node" on page 4-10 in Chapter 4, *"Configuring the DL3100."*

6 Diagnosing and Troubleshooting the DL3100

The DL3100 performs a self-test upon power-up.

During the self-test, messages will appear in the front-panel display in the order listed below:

`DL3100 SR.XXX.XX` (where xxx.xx is the software revision level)

`NODE STATUS OK`

`EFS 99.9 PERCENT`

When the percent of Error Free Seconds (EFS) displays, the DL3100 activates its top level menu loop and the unit is ready for operation.

If an error is detected during the self-test, the unit will momentarily display an error message, followed by the default display (EFS XX.XX percent).

Table 6-1 gives a list of possible error messages.

Table 6-1 Self-Test Error Indicator

Error Message
CTRLBUS FAIL
CTRLBUS ERROR
RAM FAILURE
ROM CHKSUM FAIL
NODE RESET
DATABASE RESET
POWERSUPLY ERR
FAN FAILURE
BATTERY FAILURE
RT CLOCK ERROR
EXTERNAL ALARM

If you receive one of these messages, it means that the DL3100 has an internal error. Contact Technical Support at (408) 745-4200 for assistance or to return the unit for repair.

Running Diagnostic Tests

To verify that your connections and T3 lines are functioning properly, you can run the following basic diagnostic tests. Each of these tests can be initiated from either the terminal interface menus or the front panel:

- T3MB Network Loopback
- T3MB DTE Loopback
- HSDB DTE/Network Loopback
- HVDB DTE/Network Loopback

NOTE: The DL3100 supports HSSI local and remote T3 loopbacks initiated through DTE control of LA and LB leads on the HSDB. These leads can be activated using an external test set, or through the HSSI router.
You do not need to inform the telephone company that you are running these tests. However, if the tests reveal a problem with telephone company service or with the DL3100, you should inform the telephone company that the DTE equipment or the DL3100 must be removed from service.

Running Tests Using the Terminal Interface

This section gives procedures for running diagnostics using the terminal interface.

Testing the T3MB DTE/Network Interface

The T3MB features built-in diagnostics which include DTE and network loopback tests. You initiate, verify and cancel these tests through the T3MB Tests Menu.

To access this menu, select T3MB Tests from the Node/T3MB Main Menu and press **`Return`**.

Figure 6-1 shows an example of the T3MB Tests Menu.

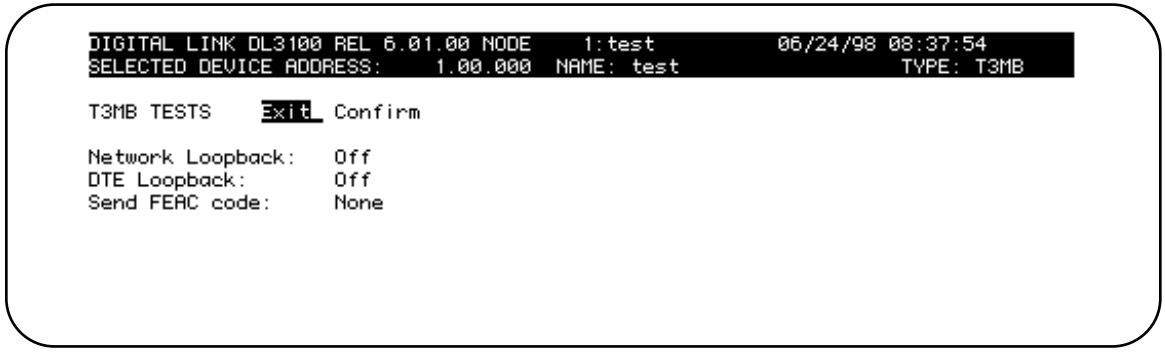

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 08:37:54
SELECTED DEVICE ADDRESS: 1.00.000 NAME: test TYPE: T3MB
T3MB TESTS Exit Confirm
Network Loopback: Off
DTE Loopback: Off
Send FEAC code: None

Figure 6-1 T3MB Tests Menu

WARNING: Running a loopback test will interrupt traffic to the DL3100.

To initiate a loopback:

- **From the T3MB Tests Menu, select DTE or Network Loopback, use the space bar to toggle to On. With On in the display, select Confirm and press `Return`.**

To cancel a test that is running:

- **From the T3MB Tests Menu, select DTE or Network Loopback, use the spacebar to toggle to Off. With Off in the display, select Confirm and press `Return`.**

NOTE: The unit will not allow both the DTE Loopback and the Network Loopback to be on at the same time.

Network Loopback

The Network Loopback verifies the operation of the network, by looping the data received from the network back towards the network. The data is regenerated prior to being looped back; however, no additional processing

of the data is performed by the DL3100. This minimizes any impact that the DL3100 might have on the data so that network problems can be isolated.

DTE Loopback

The DTE Loopback on the T3MB verifies the operation of the signal path from the DTE equipment, through the T3 framer, and back to the DTE connectors.

Running this test loops the network transmit signal to the DL3100's network receive circuitry. If everything is working properly, the DTE equipment will receive the same signal that it transmitted. The T3 network transmitter continues to transmit towards the network as long as the unit is in DTE loopback.

Send FEAC Code

The Send FEAC code has two options:

- Loopup—puts the far end unit into network loopback mode
- Loopdown—disables the loopback mode

Testing the HSDB/HVDB DTE/Network Interface

The HSDB and HVDB feature a bi-directional DTE/Network Loopback diagnostic test.

You use the HSDB or HVDB Tests Menu to initiate this loopback.

To access these menus the HSDB or HVDB must be the selected device. From the HSDB/HVDB Main Menu select Tests and press **Return**.

The HSDB and HVDB Test Menus are exactly the same, except for the menu name.

Figure 6-2 shows an example of the HVDB Tests Menu.

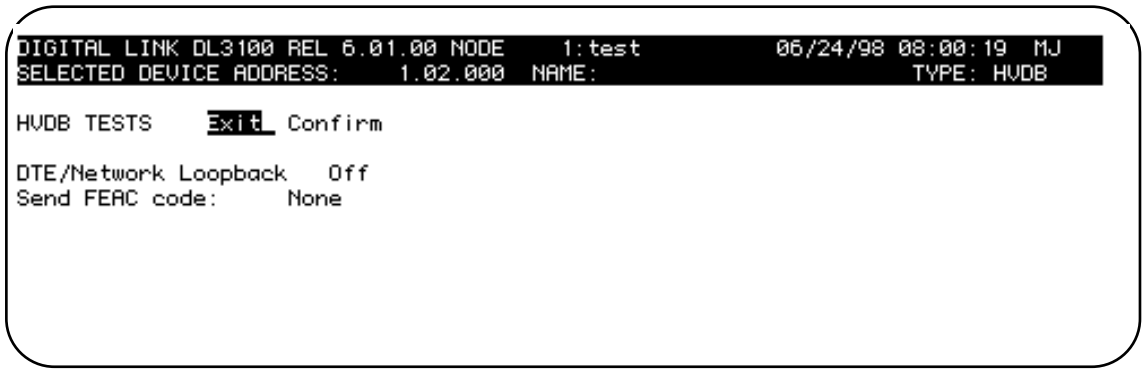

DIGITAL LINK DL3100 REL 6.01.00 NODE 1:test 06/24/98 08:00:19 MJ
SELECTED DEVICE ADDRESS: 1.02.000 NAME: TYPE: HVDB
HVDB TESTS Exit Confirm
DTE/Network Loopback Off
Send FEAC code: None

Figure 6-2 HVDB Tests Menu

WARNING: Running loopback tests will interrupt traffic to the DL3100.

NET/DTE Loopback

The NET/DTE loopback is a bi-directional loopback that loops the received DTE signal back to the DTE, and the signal from the T3MB back towards the T3MB. This loopback verifies operation of the following:

- The DTE and associated cabling
- The DTE Board
- The link between the DTE board and the T3MB

NOTE: The NET/DTE Loopback is performed on a single DTE at a time: HSDB/HVDB 1, 2 or 3.

To initiate a test:

▼ **Select DTE/Network Loopback and use the space bar to toggle to On. With On in the display, select Confirm and press Return.**

To cancel a test that is running:

▼ **Select DTE/Network Loopback and use the space bar to toggle to Off. With Off in the display, select Confirm and press `Return`.**

Running Tests from the Front Panel

The front panel Test menu is broken down into three submenus:

- Network Tests Menu
- HSDB/HVDB (1,2, or 3)Tests Menu

For more information on running tests from the front panel, refer to "Using the Test Menu" on page 7-18 in Chapter 7, *"Using the Front Panel Interface."*

To access the Test Menu, continue pressing the down arrow from the Main Menu (EFS XX.XX PERCENT) until Test appears in the display, and press Enter. Use the up and down arrows to toggle through the submenus.

NOTE: Pressing the up and down arrows simultaneously terminates all tests or loopbacks.

Running Network Tests

You use the Network Tests Menu to run network loopback tests and DTE loopback tests from the front panel. To access the Network Tests Menu, press **ENTR** from the Test Menu. Press the down arrow until Network Tests appears in the display and press **ENTR**. Toggle between the two tests.

To initiate a network loopback from the front panel, press **ENTR** when Net Loopback appears in the display.

NOTE: Whenever a loopback is in operation, a plus sign (+) will appear in the display after the name of the loopback, and the front panel **TEST LED** will light red.

To end the loopback, press **ENTR** again while still in the Net Loopback Menu.

NOTE: You can cancel a test or loopback from any place in any menu by pressing the up and down arrows simultaneously. However, this will cancel all tests and loopbacks currently in progress.

DTE Loopback

To initiate a DTE loopback from the front panel, press **ENTR** when DTE Loopback appears in the display.

To end the loopback, press **ENTR** again while still in the DTE Loopback Menu.

Running HSDB/HVDB Tests

You can also run an HSDB/HVDB Net/DTE Loopback from the front panel. To select the desired HSDB/HVDB on which to run the loopback, press **ENTR** when TESTS appears in the display. Cycle through the Test menus, using the up or down arrows, until the desired HSDB or HVDB (1, 2 or 3) appears in the display.

To run a Net/DTE Loopback from the front panel, press **ENTR** from the HSDB/HVDB (1, 2, 3) Tests menu, when Net/DTE Loopback appears in the display.

To end the loopback, press **ENTR** again while still in the Net/DTE Loopback Menu.

Running a Lamp Test

To verify that all the front panel LED lamps are working, you can run a Lamp Test.

To run a Lamp Test, press the **STAT** and **ENTR** buttons simultaneously. All the LEDs on the front panel should light.

If any LEDs do not light, call Digital Link Customer Support at (408) 745-4200.

For a description of front panel LEDs, see Appendix A, *"DL3100 Technical Specifications."*

Troubleshooting the DL3100

This section describes problems you may encounter on the DL3100 and suggests ways you can troubleshoot them.

DL3100 Problems

Table 6-1 is a list of problems with suggested solutions.

Table 6-2 Troubleshooting Guide

Problem	Solution
The DL3100 does not power up.	If the DL3100 is AC powered, make sure it is plugged into a live AC outlet. If it is DC powered, make sure the respective DC leads are not crossed.
	Check all fuses for opens and replace as needed. If the DL3100 blows fuses continuously, call Digital Link Technical Support.
You cannot communicate with the remote DL3100.	Verify that the local and remote units have unique node IDs.
	Make sure your T3 port LEDs are solid green, indicating that the circuits are up and running.
	Make sure both units are in Multidrop mode.
The TEST LED on the DL3100 is constantly on.	Make sure no tests are being initiated and check the Test display from a terminal.
	If a test is running, end it by selecting the test and setting it to Off in the T3MB, HSDB or HVDB Tests Menus.
	Make sure the DTE device or the T3 carrier is not sending loop up and loop down codes.
The T3 port LEDs on the DL3100 never illuminate.	Make sure the T3 cable from your service provider is connected to the DL3100.
	Set the DL3100 transmit clock to Internal. Remove the T3 cable from the affected T3 port and hardloop the DL3100 on the transmit side by connecting the transmit and receive connectors.
The T3 LEDs on the DL3100 are constantly red.	Check the T3 port configuration to make sure the framing and applications data link are what the carrier is providing.
	Check each DL3100 for excessive errors.
	Check the T3 cabling or inside wiring for possible problems.
	Perform the hardloop procedure on the affected T3 port to verify that the T3 port is functioning properly.
The DTE port LEDs on the DL3100 do not illuminate.	Make sure that the correct T3 cable is connected to the correct T3 port.
	If the connected DTE device does not support the **RTS** or **DTR** LEDs, configure the DL3100 CTS Control to Assert CTS.
The T3 Alarm LEDs on the DL3100 do not clear.	Alarm thresholds may have been exceeded for the 15-minute or 24-hour periods. If other thresholds have not been exceeded, the DL3100 automatically clears these alarms after the period has passed.

Table 6-2 Troubleshooting Guide (Continued)

Problem	Solution
The connected DTE device shows intermittent errors.	Run a DTE/NET loopback to verify the physical connection between the local DTE device and the DL3100.
If errors are reported during this loopback, check the DTE cable.	Make sure the DTE device supports the DTE port clocking option.
	Use SCTE clocking for the DTE device if the application is using V.35.
	Make sure the DTE device can handle the set DTE clocking speed.
The T3 ports on the DL3100 cannot be put into network loopback from the carrier.	Make sure the carrier is sending a standard FEAC loop-up code to the T3 port.
The DTE/Network loopback does not work towards the locally connected DTE device.	Make sure the DTE device can run to a DCE in loopback.
	If configured for SCTE, the DTE device must be able to recognize an inverted clock. If it does not, set the clocking to SCT.
The DL3100 has timing and synchronization problems.	Make sure the timing source is set properly. To use the internal timing source of the T3MB to generate the T3 transmit timing, set the clock source to Internal. To use the recovered receive timing to clock the transmit signal, set the clock source to Network. To provide clocking from a customer-supplied external 1.544 MHz clock, set the clock source to External. Make sure the proper T3 cables are plugged into the corresponding ports on the DL3100.
You cannot access the DL3100 T3 Mux from a terminal.	The terminal must be running a VT-100 or compatible terminal emulation program.
	Make sure you are using a straight through cable with pin 8 CTS cut at the terminal end.
	Make sure the comm port parameters match the terminal's and the DL3100 has a unique ID. If the DL3100 is in a daisy-chain, you can display a roll call of all unit numbers by pressing **`Ctrl-X`** five times.

7 Using the Front Panel Interface

The front panel interface lets you

- View and change the DL3100 configuration from the Configuration Menu.
- Run diagnostic tests on the DL3100 from the Test Menu.
- View the status of the Node, Network and HSDB or HVDB from the Display Menu.

You will find the front panel interface easy to use if you are an experienced user. If you are not, the best way to learn the system's contents and organization is by using the terminal interface. The terminal interface displays the system in full menus, as opposed to the front panel interface which displays only one line item at a time.

NOTE: Because the front panel is limited in its capability, you will most likely use the front panel only when a terminal is not readily available. However, sometimes you will find it easier to use the front panel interface to perform a task rather than connect a terminal to perform the task from the terminal interface.

What You Cannot Do from the Front Panel Interface

The front panel interface does not allow you to:

- Set alarm conditions and thresholds
- Configure T3MB TDL
- Configure for SNMP
- Perform management functions
- Perform most system utilities

You must use the terminal interface to perform these functions.

The Front Panel

The front panel interface consists of a 16-character fluorescent display and a five-button keypad. The interface displays one line of information at a time. You use the keypad to interact with the front panel interface.

Figure 7-1 shows the DL3100 front panel interface.

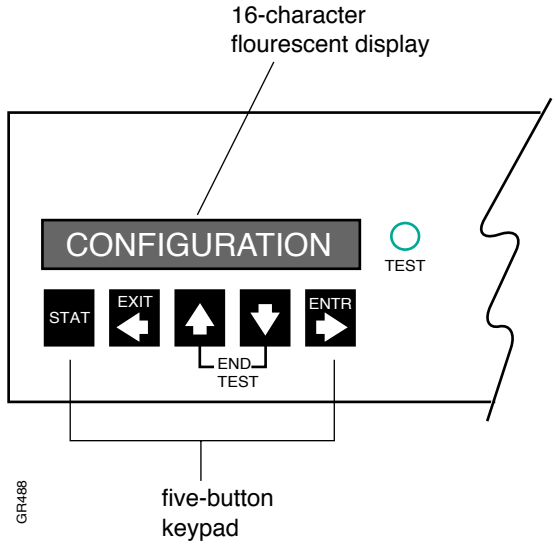


Figure 7-1 Front Panel Interface

The front panel interface can be disabled only from the terminal interface, using the Node Configuration Menu.

Front Panel Keys

You can perform the following functions using the front panel keys at the appropriate time:

To cycle through the available options, use the up or down arrows.

To move down one menu level, press **ENTR**.

To move up one menu level, press **EXIT**.

To open a menu, press **ENTR**.

You can edit by performing the following functions:

To activate edit mode, press **ENTR**.

To execute a change in the configuration, press **ENTR**.

To exit without executing a change, press **EXIT**.

Throughout this chapter you will see examples of how these keys are used.

Some menu items are more complex than others and require a good understanding of the DL3100.

How to Navigate the Front Panel Interface

The front panel interface is organized into three main menus which are at the top level of a hierarchical structure shown below.

Each menu may contain submenus which in turn may contain submenus. To open a menu, you display the menu using the up and down arrows (▲ ▼), then press **ENTR**.

What You See

You see one menu item at a time in the 16-character fluorescent display. On power up, the default EFS XX.XX PERCENT reading appears in the display.

Pressing the down arrow once allows you to select the remote unit.

As you continue to press the down arrow you will see the top level of the main menu structure.

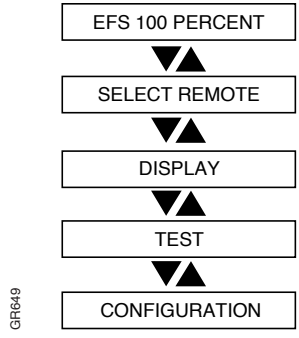


Figure 7-2 Top Level Menus

Pressing **ENTR** at any of the top level menus allows you to see that menu's submenu options.

For example, when you open the Configuration Menu, you see Backup Database, a submenu.

To see another submenu, you select it using the up or down arrow and press **ENTR**.

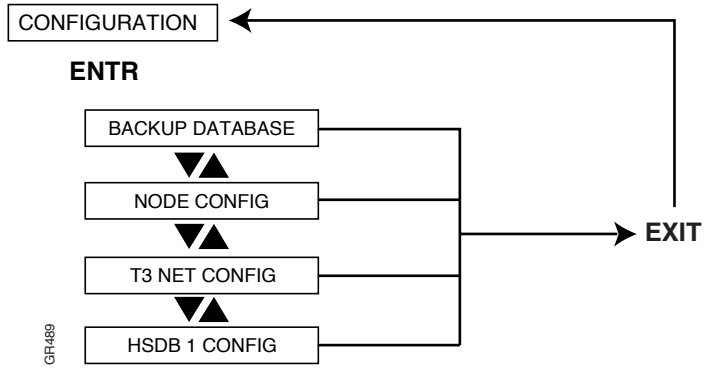


Figure 7-3 Configuration Menu

Editing a Parameter

To modify a parameter such as the node ID:

1. **Open the Configuration Menu by pressing ENTR.**

   Toggle through the submenus until the Node Config Menu appears.

2. **Press ENTR to open this menu.**

   The node ID appears.

3. **Press ENTR again.**

   The actual ID appears.

4. **Press ENTR again to activate edit mode (the first ID character starts to blink).**

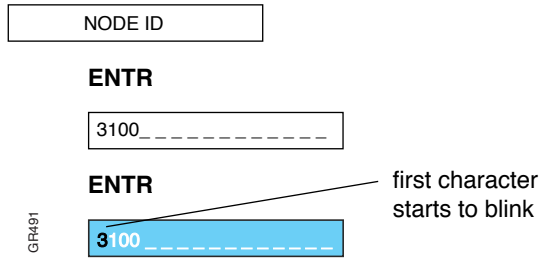


Figure 7-4 Edit Mode

5. **Edit the ID one character at a time.**

   Use the up and down arrows to change a character.

6. **Press ENTR for the changes to take effect**

7. **Repeat the process for each character.**

8. **To exit the edit mode once you have completed all the desired changes, move the cursor to the next underlined space (_) and press ENTR. Then press EXIT to exit the parameter.**

   or

   wait for the display to return to its default state,

   or

   press **EXIT** to exit without executing any changes.

Preparing for the Initial Configuration

Before you start an initial configuration, you need to have the required information ready and establish a method of record keeping.

Required Information

Before you configure the unit, we suggest you collect the following information:

- **Framing and line code requirements as specified in the work order from your service provider**

Keeping a Record

We suggest you keep a written record of each unit's configuration. For a copy of the configuration worksheet, see "Configuration Worksheet" on page A-11 in Appendix A, *"DL3100 Technical Specifications."*

Selecting the Remote or Local Unit

The Select Local/Remote command works like a toggle switch—you switch between the local and remote units' front panel interface to monitor one or the other.

At the Select Local/Remote display, press **ENTR**. The display will begin blinking. Press **ENTR** again to switch.

When the remote unit is selected, the letter R will precede all the menu displays.

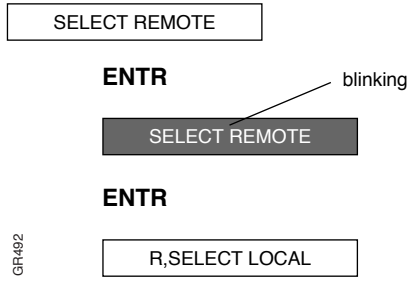


Figure 7-5 Selecting the Remote Unit

Configuring the DL3100

You use the Configuration Menu to configure various parameters of the unit, the network and the DTE boards. The Configuration Menu consists of three submenus: the Node Config, T3 Net Config and HSDB/HVDB (1, 2, 3) Config Menus.

NOTE: The Backup Database function is also found under the Configuration Menu.

To open the Configuration Menu, use the up or down arrows to move to the Menu and press **ENTR**.

The Backup Database submenu appears.

The Configuration submenus are shown below.

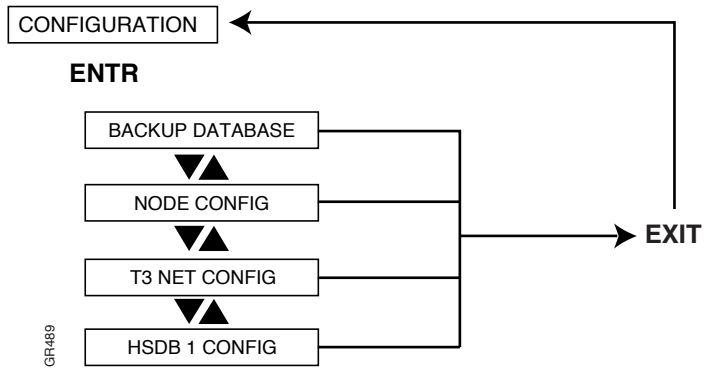


Figure 7-6 Configuration Submenus

The Node Config Submenu

The items in the Node Config Menu are shown below.

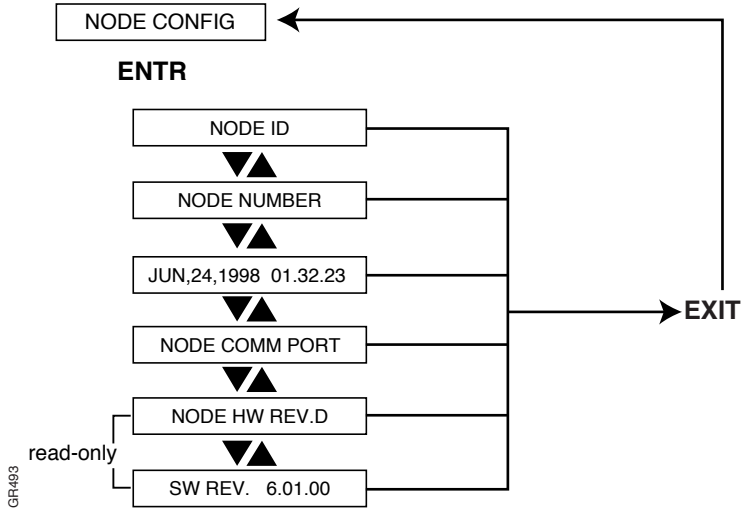


Figure 7-7 Node Config Menu

Use the up and down arrows to move from item to item. To activate edit mode, press **ENTR**.

Node Config Menu Parameters

The Node Config Menu parameters are as follows:

- Unit ID, node number, date and time

  Edit each item one character at a time. To move to the next character, press **ENTR**.

- Node Comm Port submenu

  You can display and modify the comm port settings from the front panel Comm Port submenu.

The Comm Port Parameters

The comm port parameters are:

- Baud Rate
- Parity
- Data Bits (Terminal # Bits)
- Stop Bits
- Use XON/XOFF
- Multidrop Mode (Terminal Multidrop)

NOTE: Parameters shown in parenthesis are the names of the equivalent parameters in the terminal interface.

The front panel displays one parameter and its current value.

To view and modify the comm port settings, follow the procedure in the example below.

1. **From the Configuration menu, press ENTR and then the down arrow to access the Node Config Menu.**
2. **Press ENTR to open the Node Config Menu.**

   The Node ID parameter appears.

3. **Press ENTR again to view the ID.**

   Example: 3100DSM_ _ _ _ _ _ _ _ _

4. **To edit the ID, follow the procedure given in "Editing a Parameter" on page 7-4.**

5. **Enter the Node Comm Port submenu using the down arrow to select it and press ENTR.**

   BAUD RATE 9600 appears.

   Press **ENTR** to activate edit mode. (BAUD RATE 9600 blinks.)

6. **Cycle through the available baud rate options using the up or down arrows and press ENTR to select an option, or press EXIT to exit without executing the baud rate change.**

7. **To move to the next comm port parameter, press the up or down arrow.**

   Edit the remaining comm port parameters as previously discussed.

The T3 Net Config Menu

The Net Config Menu contains the following items:

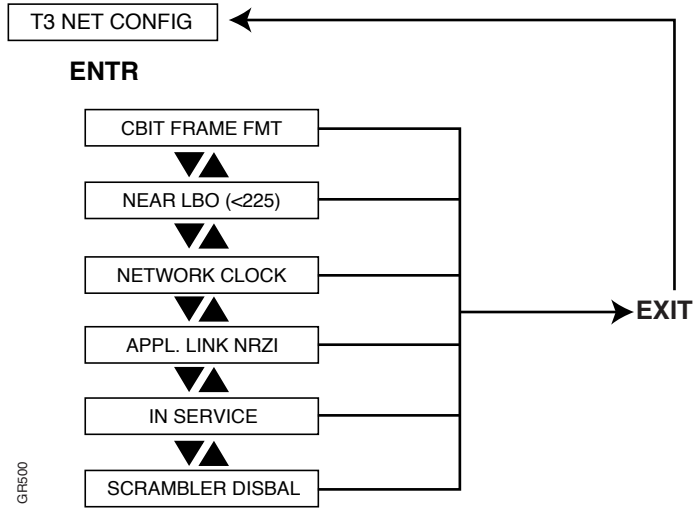


Figure 7-8 T3 Net Config Menu

For more information about these items, refer to "Configuring the T3MB" on page 4-16 in Chapter 4, *"Configuring the DL3100."*

Configuring the Data Ports

You use the HSDB (1, 2, or 3) Config and/or the HVDB (1, 2, or 3) Config Menus to configure your data ports. Refer to "Configuring the HSDB and the HVDB" on page 4-21 in Chapter 4, *"Configuring the DL3100"* for a description of the parameters.

Configuring the HSDB

Follow these steps to configure the HSDB:

1. **From the Configuration menu, press ENTR and open HSDB (1, 2, or 3) CONFIG using the up or down arrows. Press ENTR.**

   ```
   DTE FREQ xx.x MB appears.
   ```

2. **To activate edit mode, press ENTR again.**

   ```
   DTE FREQ xx.x MB starts to blink.
   ```

   To take no action and move to the next item, press **EXIT**.

   Press the up or down arrows to cycle through the available options and press **ENTR** to select an option.

3. **Press the down arrow to move to the next parameter, Use Divided/Full Clock.**

4. **Press ENTR to activate edit mode.**

   The display starts to blink.

   (Or press **EXIT** to take no action and move to the next item)

   Press the up or down arrows to select either Full Clock or Divided Clock and press **ENTR** to confirm the option selected.

5. **Use the same method to configure the other parameters in the HSDB Menu for this data port. Repeat for any other HSDB data ports.**

HSDB Config Menu Parameters

The following is a list of HSDB Config Menu parameters:

- DTE rate

  Lets you select DTE rates in increments of 300 kbps ranging from 300 kbps to 44.2 Mbps.

- Clock

  Lets you select either Full Clock or Divided Clock.

- Service

  Lets you place the HSDB In Service or Out of Service.

- Delete DTE

  Prohibits the data board from recognizing the DTE.

  For more information regarding these parameters, refer to "Configuring the HSDB" on page 4-22 in Chapter 4, *"Configuring the DL3100."*

- HSDB hardware revision

  States the hardware revision.

- DTE loss detection

  Lets you select either None or TA.

- CA options

  Lets you select Auto, Assert, or Deassert.

Configuring the HVDB

Follow these steps to configure the HVDB:

1. **From the Configuration Menu, press ENTR and open HVDB 1,2, or 3) CONFIG using the up or down arrows. Press ENTR.**

   ```
   DTE FREQ xx.x MB appears.
   ```

2. **To activate edit mode, press ENTR.**

   ```
   DTE FREQ xx.x MB starts to blink.
   ```

   To take no action and move to the next item, press **EXIT**.

   Press the up or down arrows to cycle through the available options and press **ENTR** to select an option.

3. **Press the down arrow to move to the next parameter, In/Out Service.**

4. **Press ENTR to activate edit mode.**

   The display starts to blink.

   To take no action and move to the next item, press **EXIT**.

   Press the up or down arrow to select either In Service or Out of Service and press **ENTR** to confirm the option selected.

5. **Use the same method to configure the other parameters in the HVDB Menu for this data port. Repeat for any other HVDB data ports.**

HVDB Config Menu Parameters

The following is a list of the HVDB Config Menu parameters:

- DTE rate

  Lets you select DTE rates in increments of 300 kbps ranging from 300 kbps to 44.2 Mbps. The maximum data rate recommended for V.35 is 4 Mbps.

- Service

  Lets you place the HSDB In Service or Out of Service.

- CTS

  Lets you assert Clear To Send (Assert CTS) so that it is always sent to the DTE in response to an RTS.

- TD

  Lets you determine whether the transmit clock is to be received from the DTE leads (SCTE) or from the DL3100 (SCT).

- Clock

  Lets you set the TD clock to normal or inverted.

- Delete DTE

  Prohibits the data board from recognizing the DTE.

For more information regarding these parameters, refer to "Configuring the HVDB" on page 4-25 in Chapter 4, *"Configuring the DL3100."*

Displaying Status and Statistics

You use the Display Menu to monitor network status, node status, and network and HSDB/HVDB statistics.

The data in the Display Menu is a subset of the parameters that are available on the terminal interface.

You can monitor both the local and remote units from the front panel Display Menu.

Monitoring the Local and Remote Units

The parameters in the Display Menu are:

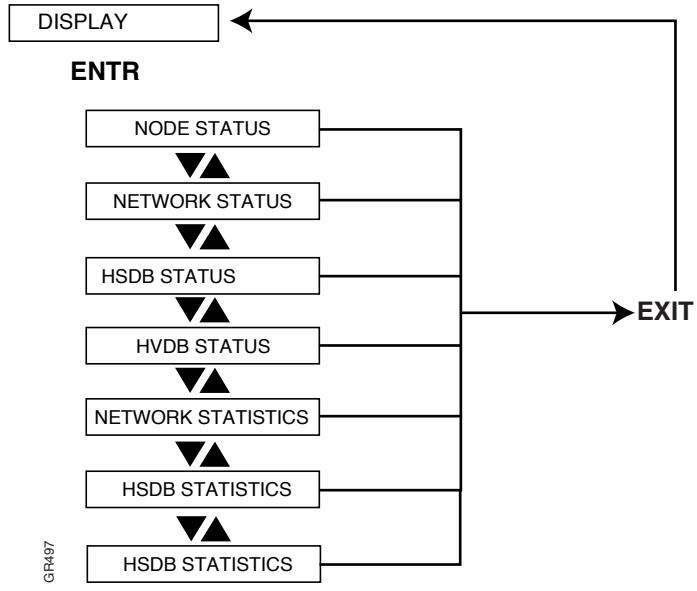


Figure 7-9 Display Menu

Monitoring the Node Status

You use the Node Status menu to reveal the status of the remote or local unit.

The message “NODE STATUS OK” will appear if the unit is operating properly.

To view the status, press **ENTR** from the Node Status Menu.

If one of more errors are detected, the display will show one or more of the following error messages:

```
CTRLBUS FAIL

CTRLBUS ERROR
```

```
RAM FAILURE
ROM CHKSUM FAIL
UNIT RESET
DATABASE RESET
POWERSUPLY ERR
FAN FAILURE
BATTERY FAILURE
RT CLOCK ERROR
EXTERNAL ALARM
```

Use the up and down arrows to view additional messages.

Monitoring the Network Status

You use the Network Status Menu to view the status of the T3 network.

The message "NET STATUS OK" will appear if the T3 network is operating properly.

To view the network status, press **ENTR** from the Network Status Menu.

If one of more errors are detected, the display will show one or more of the error messages defined in "Monitoring Network Alarms and Status" on page 5-5 in Chapter 5, *"Monitoring and Managing the DL3100."*

Monitoring HSDB/HVDB (1, 2, 3) Status

You use the HSDB and HVDB Status Menus to view the status of the existing DTEs.

The message "DTE STATUS OK" will appear if the DTE is functioning properly.

To view a DTE's status, press **ENTR** from the corresponding (1, 2, or 3) HSDB or HVDB Status Menu.

If one of more errors are detected, the display will show one or more of the error messages defined in "Monitoring HSDB and HVDB Alarms and Status" on page 5-9 in Chapter 5, *"Monitoring and Managing the DL3100."*

Monitoring Network Statistics

You use the Network Statistics Menu to view and clear the T3 network performance statistics.

The parameters that you can view from the Network Statistics Menu are shown next.

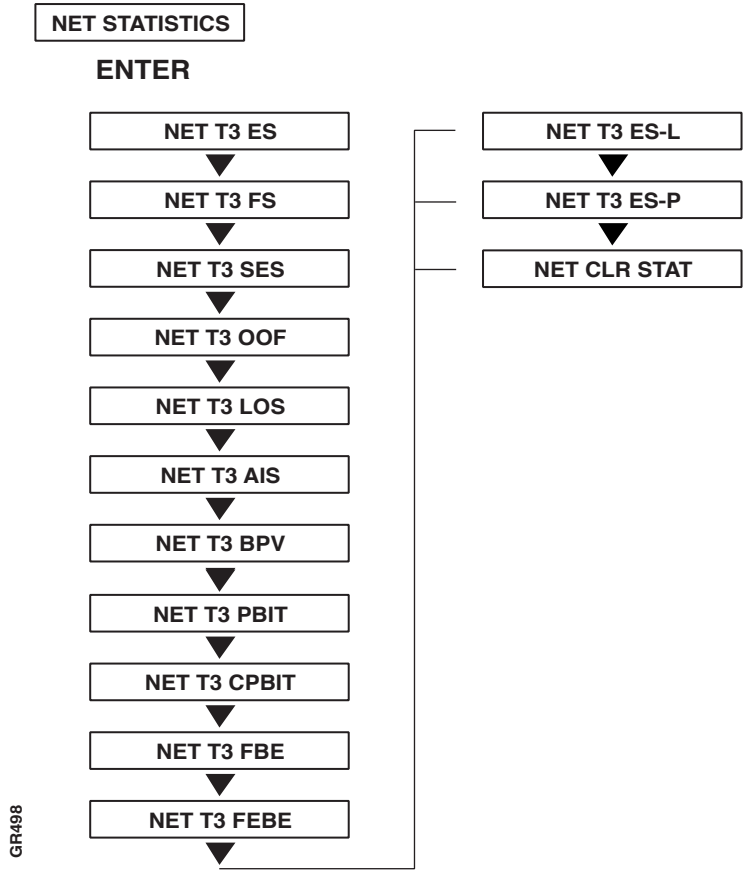


Figure 7-10 Network Statistics Menu

For each of these parameters (with the exception of CLR NET STAT) you can view the following set of performance statistics.

To view these statistics, press **ENTR** at the appropriate parameter and use the up and down arrows to scroll through the performance statistics.

- SEC 491 VALID.96

  Counts the seconds and number of valid intervals (maximum of 96) in the past 24 hours.

- CUR345

  Counts the number of errors in the current interval for that performance register.

- TOTL.679

  Counts the number of seconds in error or the number of errors for that performance statistic over the past 24 hours, or since the registers were last cleared.

- (1 - 96) =900

  Counts the number of seconds in error and the number of errors for that performance statistic during the most recent 15-minute interval.

  For example:

  34 = 42

  The number to the left of the display signifies the 15-minute interval represented (1 to 96). The number to the right is the number of errors (maximum of 900) occurring during that period.

  Continue to press the down arrow to view subsequent intervals.

Clearing Network Statistics

The NET CLR STAT is the last entry in the Net Statistics Menu. You use NET CLR STAT to clear all network statistics.

To clear all the network statistics, press **ENTR** at the NET CLR STAT display. To confirm the action, press **ENTR** again when the display is blinking, or press **EXIT** to take no action.

For more information about network statistics, see "Monitoring Network Statistics" on page 5-14 in Chapter 5, *"Monitoring and Managing the DL3100."*

Monitoring HSDB/HVDB Statistics

You use the HSDB or HVDB (1, 2, or 3) Statistics Menus to view and clear the DTE performance statistics.

The illustration below shows the parameters that you can view from the HSDB/HVDB (1, 2, or 3) Statistics Menu, using an HSDB DTE. However, the parameters are the same for HBDV devices.

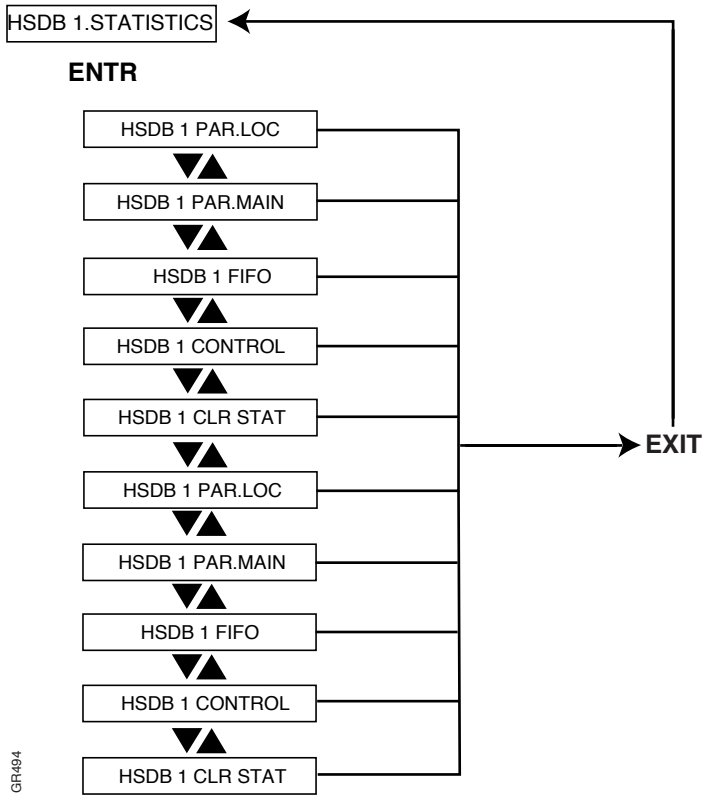


Figure 7-11 Statistics Menu

For each of these parameters (with the exception of CLR HSDB/HVDB/STAT) you can view the following set of performance statistics.

To view these statistics, press **ENTR** at the appropriate parameter, and use the up and down arrows to scroll through the performance statistics:

- SEC 491 VALID.96

  Counts the seconds and number of valid intervals (maximum of 96) in the past 24 hours.

- CUR345

  Counts the number of errors in the current interval for that performance register.

- TOTL.9679

  Counts the number of seconds in error or the number of errors for that performance statistic over the past 24 hours, or since the registers were last cleared.

- (1 - 96) =900

  Counts the number of seconds in error and the number of errors (maximum of 900) for that performance statistic during the most recent 15-minute interval.

  For example:

- 34 = 42

  The number to the left of the display signifies the 15-minute interval represented (1 to 96). The number to the right is the number of errors occurring during that period.

  Continue to press the down arrow to view subsequent intervals.

Clearing HSDB/HVDB Statistics

HSDB/HVDB CLR STAT is the last entry in the HSDB/HVDB Statistics menu. You use HSDB/HVDB CLR STAT to clear all DTE statistics.

To clear all the DTE statistics, press **ENTR** at the HSDB/HVDB CLR STAT display. To confirm the action, press **ENTR** again when the display is blinking, or press **EXIT** to take no action.

For more information about HSDB/HVDB statistics, see "Monitoring HSDB and HVDB Statistics" on page 5-20 in Chapter 5, *"Monitoring and Managing the DL3100."*

Using the Test Menu

You can perform network loopbacks and DTE loopbacks on the local DL3100 from the front panel Test Menu.

Only the Network Loopback test can be run on the remote unit from the Test Menu.

The following illustration shows the types of tests that you can perform from the front panel Test Menu.

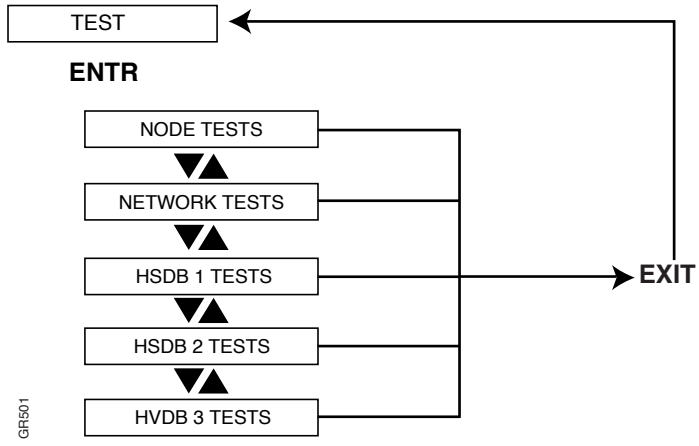


Figure 7-12 Test Menu

You can perform the following tests from the front panel:

Network Tests

- Net Loopback
- DTE Loopback

HSDB/HVDB Tests

- Net/DTE Loopback

Starting and Ending a Test

You can run only one test at a time. To run another test, you must terminate the first.

1. **To start a test, open the Test Menu and select the test from one of the submenus.**

   The test continues running until you end it.

2. **To end the test, press ENTR.**

   The name of the terminated test appears in the Test Menu.

NOTE: You can cancel a test at any time from any place in any menu by pressing the up and down arrows simultaneously. However, this will cancel all tests currently in progress.

During a Test

During a test, you will observe the following:

- The **TEST LED** on the front panel turns red, reminding you that the DL3100 is out of service during the test.
- The name of the current test appears in the display with a plus sign (+) to the right of it.
- You can open the Monitor or Configuration Menu to view performance information or change a configuration while a test is in progress.

A DL3100 Technical Specifications

This appendix covers various technical specifications.

T3 Network Port Interface

Table A-1 lists the network port interfaces for the DL3100.

Table A-1 T3 Network Port Interface

Item	Description
T3 Line Rate	44.736 Mbps ± 20 ppm
Line Code	B3ZS
Framing Format	Standard (M13) or C-bit Parity
Signal Level	To 900 ft of WECO 728 cable
Pulse Shape	Meets Bellcore TR-TSY-000009
Transmit LBO	0 ft to 225 ft, 226 ft to 450 ft
Impedance	75 Ω unbalanced, resistive
System Timing	Network, internal, or external
Specs Supported	AT&T Accunet T45
	Bellcore ANSI T1.404-1994
	ANSI T1.404-1989
	ANSI T1.107a (FEAC)

External Clock Specifications

Table A-2 lists information for the external clock.

Table A-2 External Clock Specifications

Item	Description
Input impedance	75 Ω
Input voltage	+5 V Square Wave TTL Clock Signal

Table A-2 External Clock Specifications (Continued)

Item	Description
Input signal	Unipolar, unbalanced
Input frequency	1.544 Mbps ± 50Hz
Connector type	BNC

Data Interface

Table A-3 lists the data interfaces.

Table A-3 Data Interfaces

Item	Description
Interface types	Up to three V.35 or HSSI ports
Data rates	Up to 44.2 Mbps in multiples of 300 kbps

NOTE: Digital Link recommends using a maximum of 10 Mbps on the V.35 port. You should also check the limitations of the attached DTE device.

Interface Connectors

Table A-4 lists the interface connectors for the DL3100.

Table A-4 Interface Connectors

Item	Description
HSSI Interface	
Connector	50-pin amplimite
Data Rates	To 44.21 Mbps in increments of 300 kbps
V.35 Interface	
Connector	DB-25 socket
Data Rate	To 10 Mbps in increments of 300 kbps

Table A-4 Interface Connectors (Continued)

Item	Description
Local/Remote Port	
Electrical	RS-232C compatible
Connector	DE-9 socket
Other Connectors	
Alarm Inputs	Dry Form C relays
Network	BNC

Communication Port (ASCII)

Table A-5 lists the communication ports for ASCII.

Table A-5 Communication Port (ASCII)

Item	Description
Baud rate	300, 600, 1200, 2400, 4800, 9600
Parity	Odd, Even, or None
Data bits	7 or 8
Stop bits	1, 1.5, or 2
Local terminal XON/XOFF	Enable or Disable
Connector	DE-9 socket
Protocol	ANSI (VT-100) terminals
Multi-drop	Up to 12 DL3100 systems
Remote access	Modem

Communication Port (SNMP)

Table A-6 lists the communication port parameters for SNMP.

Table A-6 Communication Port (SNMP NMS)

Item	Description
Baud rate	300, 600, 1200, 2400, 4800, 9600
Parity	Odd, Even, or None

Table A-6 Communication Port (SNMP NMS) (Continued)

Item	Description
Data bits	8
Stop bits	1, 1.5, or 2
SNMP XON/XOFF	Enable or Disable
Connector	DE-9 socket
Protocol	SNMP (UDP/IP) over SLIP

Diagnostics

Table A-7 lists the diagnostic tests and test indicators.

Table A-7 Diagnostics

Item	Description
Loopbacks	Local and remote DTE/Network
LEDs (network)	**INS**, **ALM**, **RED**, **YEL**, **BLU**, **BPV**, **PAR**
LEDs (per DTE port)	**INS**, **TEST**, **TD**, **RD**, **TA/RTS**, **CA/CTS**, **DTR**
Mini patch jacks	T3 Send Monitor
	T3 Receive Monitor

Power

The power requirements are as follows:

120 VAC, 0.5 A maximum (110 VAC to 230 VAC, 47 Hz to 63 Hz)

220 VAC, 0.25 A maximum

-48 VDC, 1.2 A maximum (-42 VDC to -72 VDC)

The DL3100 is protected by a user serviceable external fuse rated at 250 volts, 1.6 ampere.

Mechanical

Table A-8 lists the mechanical information.

Table A-8 Mechanical Information

Item	Description
Dimensions	2 RU, 43.2 cm (17 in) W x 29.2 cm (11.5 in) D x 7.7 cm (3 in) H
Mounting	Rack mounted in a 48.3 cm (19 in) or 58.4 cm (23 in) rack, desktop or stackable

Environmental

Table A-9 discusses environmental information.

Table A-9 Environmental Information

Item	Description
Operating temperature	0°C to 50°C
Storage temperature	-35°C to +85°C
Relative humidity	0% to 95% noncondensing
Altitude	-61 m (-200 ft) to 3048 m (10,000 ft)

Regulatory

Table A-10 gives regulatory information.

Table A-10 Regulatory Compliances

Regulatory Compliances
UL 1950 3rd Edition
CAN/CSA - C22.2 No. 950-M95
FCC Part 15 Class A
DOC

Downloadable Software

New features and functionality can be added on line to the DL3100 using the DL3100 built-in communications port.

Alarms

The alarms are on the DL3100 are:

- Common Alarm Indicator LEDs
- Common Visual Alarm Contact through a DE-9 connector
- Common Audible Alarm Contact through a DE-9 connector
- Common External Alarm Input through a DE-9 connector

Alarm Types

Table A-11 states the alarm types on the DL3100.

Table A-11 Alarm Types

Carrier	Alarm Type
T3 Network Port	NET Carrier Loss Alarm
	NET Sync Loss Alarm
	NET AIS Received Alarm
	NET Yellow Received Alarm
	CRC, BPV, OOF Threshold Alarm
Data Port	RTS Loss Alarm
	DTR Loss Alarm

Equipment Grounding Conductor

The equipment grounding conductor should be installed as part of the circuit supplying the system and should not be smaller in size than the ungrounded branch-circuit supply conductors.

A bare, covered, or insulated grounding conductor is acceptable. An individually covered or insulated conductor should have a green (or a green with one or more yellow stripes) continuous outer finish.

The attachment-plug receptacle in the vicinity of the system should be of a grounding type and the grounding conductor serving the receptacle should be connected to earth ground at the service equipment.

Fan Filter

The fan filter should be inspected annually (at a minimum) and cleaned, if necessary. The filter can be cleaned with soap and water. If replacement filters and mounting clips are needed, they are available from Digital Link, part number DL1100.

Front Panel LEDs and Connectors

Figure A-1 shows the DL3100 front panel LEDs, buttons, and connectors.

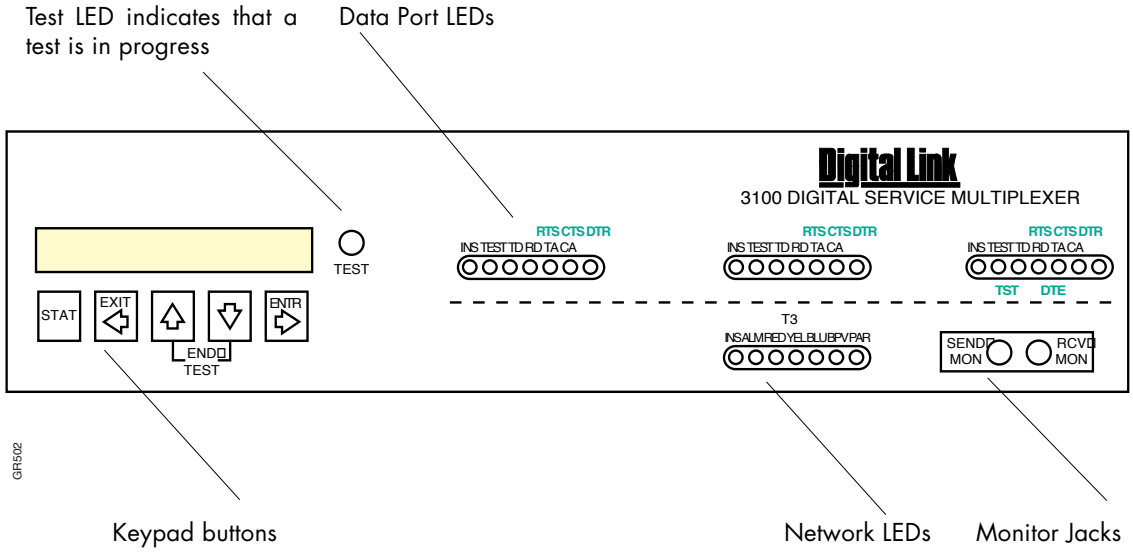


Figure A-1 DL3100 Front Panel LEDs and Buttons

Table A-12 defines the LEDs, buttons, and connectors found on the DL3100 front panel. For more information about the front panel operation, refer to Chapter 7, *"Using the Front Panel Interface."*

Table A-12 Front Panel LEDs, Buttons and Connectors

LED/Button	Status	Significance/Function
TEST	Red	Loopback or test is in progress

Table A-12 Front Panel LEDs, Buttons and Connectors (Continued)

	LED/Button	Status	Significance/Function
T3 Main Board	**INS**	Green Amber Red	Module is in service and functioning normally Module is operating normally but is out of service Module failure
	ALM	Red	Network is in an alarm state
	RED	Red	Loss of signal or out-of-frame conditions on receive T3 signal
	YEL	Red	Far-end DL3100 or other remote equipment is in red alarm
	BLU	Red	AIS received denoting an upstream failure
	BPV	Flashing	Bipolar violations detected on the receive T3 signal
	PAR	Red	C-Bit or P-Bit parity errors detected on receive T3 signal
HSDB/HVDB Boards	**INS**	Green Amber Red	Module is in service and functioning normally Module is operating normally but is out of service Module failure
	TEST	Red	A bi-directional DTE/Network loopback is in progress
	TD	Flashing or green	Data is being transmitted to the DTE
	RD	Flashing or green	Data is being received from the DTE
	TA/RTS	Green	Data interface equipment is available and functioning normally
	CA/CTS	Amber	Carrier equipment is available and functioning normally
Buttons	**STAT**		Indicates the location of the user in the hierarchical menu structure
	EXIT (LEFT ARROW)		Used to cancel operations or to exit to a higher level menu
	UP ARROW		Used to view the previous item or option in the same menu
	DOWN ARROW		Used to view the next item or option in the same menu
	ENTR (RIGHT ARROW)		Used to enter a submenu or to change a configuration option
Connectors	**SEND MON**		Access for external equipment to monitor the transmit signal
	RCV MON		Access for external equipment to monitor the receive signal

DL3100 Cable Model Numbers

Table A-13 gives cable model numbers for the DL3100.

Table A-13 Cables

Model Number	Description
To Communications Port	
DL1081	DE-9 socket to DE-9 plug, 2 connections
DL1082	DE-9 socket to DE-9 plug, 4 connections
DL1083	DE-9 socket to DE-9 plug, 8 connections
To Network	
DL1405-10	T3 network cable, 3 m (10 ft)
DL1405-25	T3 network cable, 7.5 m (25 ft)
To Data Terminal Equipment	
DL1400-10	V.35, M-34 plug to DB-25 plug, 3 m (10 ft)
DL1401-10	V.35, M-34 socket to DB-25 plug DTE cable, 3 m (10 ft)
DL1404-10	HSSI plug to HSSI plug cable, 3 m (10 ft)
DL1404-25	HSSI plug to HSSI plug cable, 7.5 m (25 ft)

Factory Default Configuration

The factory default settings are listed below.

Unit Configuration

Node Number	0	Autogrow	On
Date & Time	Not Assigned	Front Panel	On
Automatic Backup	5 minutes		

T3MB Configuration

Device Name	Not Assigned	Service	In Service
Scrambler	Disabled	Hardware Rev(read-only)	
Framing	C-bit Parity	Line Build Out	<225 feet
Applications Data Link	NRZ	Transmit Clock	Internal

T3MB Alarm Thresholds	Major	Minor
Bipolar Violations	1 x 10 -4	1 x 10 -6
P-bit Parity Errors	1 x 10 -4	1 x 10 -6
CP-bit Parity Errors	1 x 10 -4	1 x 10 -6
Frame Bit Errors	1 x 10 -4	1 x 10 -6

Data Port Configuration - HSDB		Data Port Configuration - HVDB	
Module Service	In Service	CTS Control	Assert
Hardware Rev.	(read-only)	SCTE	Normal
Module Name	Not assigned		
Data Rate	300 kbps-44.2 Mbps		
Clock Mode	Normal		

SNMP Configuration			
Node IP Address	0.0.0.0	Node IP Subnet Mask	0.0.0.0
Trap IP Address	0.0.0.0	Read Community String	Public
Write Community String	Public	Trap Community String	Public
SNMP Baud Rate	9600	SNMP #Bits and Parity	8 bits No Parity
SNMP Stop Bits	2 bits		

Comm Port and Terminal Configuration	
Multidrop	Enabled
Comm Port	9600, 8, no parity, 2 stop bits
Comm Port XON/XOFF	Enabled

Configuration Worksheet

Use this worksheet to keep a written record of your configuration.

Unit Configuration

Node Number		Autogrow	
Date & Time		Front Panel	
Automatic Backup			

Network Configuration

Device Name		Service	
Scrambler		Hardware Rev	
Framing		Line Build Out	
Applications Data Link		Transmit Clock	

T3MB Alarm Thresholds	Major	Minor
Bipolar Violations		
P-bit Parity Errors		
CP-bit Parity Errors		
Frame Bit Errors		

Data Port Configuration - HSDB		Data Port Configuration - HVDB	
Module Service		CTS Control	
Hardware Rev.		TD Clock	
Module Name			
Data Rate			
Clock Mode			

SNMP Configuration

Node IP Address		Node IP Subnet Mask	
Trap IP Address		Read Community String	
Write Community String		Trap Community String	
SNMP Baud Rate		SNMP #Bits and Parity	
SNMP Stop Bits		Output Port	

Comm Port and Terminal Configuration

Connection		Terminal Mode	
Timeout when Logged on		Phone Number 2	
Timeout when not Logged on		Phone Number 1	
Comm Port		Normal User Password	
Comm Port DCD		Superuser Password	
Comm Port XON/XOFF			

B DL3100 Connector and Pin Assignments

This appendix covers connector and pin assignments for the DL3100.

DB-25 to V.35 Data Port Connector Pin Assignments (DL1401)

Table B-1 lists the pin assignments for the DB-25 to V.35 DTE connector.

Table B-1 DB-25 to V.35 DTE Connector Pin Assignments

Pin No.	Pin Name	Signal Name	Signal	V.35
2	SCT A	Serial Clock XMT A	To DTE	Y
15	SCT B	Serial Clock XMT B	To DTE	AA
6	SCTE A	Serial Clock XMT A	From DTE	U
19	SCTE B	Serial Clock XMT B	From DTE	W
14	SD A	Send Data A	From DTE	P
1	SD B	Send Data B	From DTE	S
17	SCR A	Serial Clock Receive	To DTE	V
5	SCR B	Serial Clock Receive B	To DTE	X
4	RD A	Receive Data A	To DTE	R
16	RD B	Receive Data B	To DTE	T
20	DSR	Data Set Ready	To DTE	E
8	DTR	Data Terminal Ready	From DTE	H
7	RSLD	Receive Line Signal Detector	To DTE	F
9	RTS	Request to Send	From DTE	C
22	CTS	Clear to Send	To DTE	D
23	LT	Local Test	From DTE	K
		Frame Ground		A
18		Signal Ground		B

50-Pin HSSI Data Port Connector Pin Assignments (DL1404)

The pin assignments for the 50-Pin HSSI Connector pin assignments are listed below in Table B-2.

Table B-2 50-Pin HSSI Connector Pin Assignments

Pin No. + Side	Pin No. - Side	Pin Name	Signal Name	Signal
1	26	SC	Signal Ground	
2	27	RT	Receive Timing	To DTE
3	28	CA	DCE Available	To DTE
4	29	RD	Receive Data	To DTE
5	30		Reserved	To DTE
6	31	ST	Send Timing	To DTE
7	32	SG	Signal Ground	
8	33	TA	DTE Available	From DTE
9	34	TT	Terminal Timing	From DTE
10	35	LA	Loopback Circuit A	From DTE
11	36	SD	Send Data	From DTE
12	37	LB	Loopback Circuit B	From DTE
13	38	SG	Signal Ground	
14-18	39-43		5 ancillary to DTE	From DTE
19	44		Signal Ground	
20-23	45-48		5 ancillary from DCE	To DTE
24	49	TM	Test Mode	To DTE
25	50	SG	Signal Ground	

G

Glossary

ABAM

A designation for 22 gauge, 110 ohm, plastic insulated, twisted pair Western Electric cable normally used in central offices**.**

AIS (Alarm Indication Signal)

An unframed sequence of All Ones normally sent by a DSU/CSU that cannot maintain the required pulse density in AMI mode or sent by a CSU that has a loss of signal condition on its data port. The signal is sent to maintain continuity of transmission and to notify the far-end that a transmission fault exists on the line. Same as Blue Alarm.

alternate loop code

Used to invert loop codes from U.S. standard code; inverts zeros to ones and ones to zeros.

AMI (Alternate Mark Inversion)

A line code in which the signal carrying the binary value alternates between positive and negative polarities.

ANSI (American National Standards Institute)

Coordinates the development of U.S. voluntary national standards in both the private and public sectors. Standards pertain to programming languages, EDI, telecommunications and physical properties of diskettes, cartridges and magnetic tapes.

ASCII (American National Standard Code)

The standard and predominant seven-bit (eight bits with parity) character code used for data communications and data processing.

asynchronous transmission

Transmission not related to a specific frequency, or to the timing of the transmission facility.

attenuation

Reduction or loss of signal strength, measured in decibels; opposite of gain.

B

B8ZS (Bipolar 8 Zero Substitution)

A technique used to accommodate the ones density requirements of T1 transmission.

bandwidth

The data-carrying capacity of a transmission medium, usually measured in Hertz (Hz), which equals cycles per second.

baud

A measurement of the signaling speed of a data transmission device.

BER

See bit error rate.

BES (Bursty Errored Seconds)

Occurs when a second has 320 or more CRC violations. (ESF format only)

bipolar

The predominant signaling method used for digital transmission services, such as DDS and T1, in which the signal carrying the binary value successively alternates between positive and negative polarities. Zero and one values are represented by the signal amplitude at either polarity, while no value "spaces" are at zero amplitude.

bit error

Occurs when the value of an encoded bit is changed in transmission, and interpreted incorrectly by the receiver.

Bit Error Rate (BER)

The percentage of received bits that are in error, relative to a specific amount of bits received; usually expressed as a number referenced to a power of 10.

bps

Bits per second; the basic unit of measure for serial data transmission capacity; Kbits (kilobits) for thousands of bits per second; Mbitps (megabits) for millions of bits per second, and Gbits (gigabits) for billions of bits per second.

Blue Alarm

An unframed sequence of All Ones normally sent by a DSU/CSU that cannot maintain the required pulse density in AMI mode or sent by a CSU that has a loss of signal condition on its data port. The signal is sent to maintain continuity of transmission and to notify the far-end that a transmission fault exists on the line. Same as Alarm Indication Signal (AIS).

broadband

Services or interfaces that operate above the T1 data rate, typically at NxT1, T3, SONET, or ATM speeds.

BPV (Bi Polar Violation)

Occurs when the ones bit is not represented with the opposite signal of the previous ones bit.

C

CCITT

International Telegraph and Telephone Consultative Committee.

central office (CO)

The phone company switching facility or center; usually a Class 5 end office, at which subscribers' local loops terminate.

channel

A physical or logical path allowing the transmission of information; the path connecting a data source and receiver.

circuit

Generally referring to a transmission medium connecting two or more electronic devices.

clear channel

A characteristic of a transmission path or digital circuit in which the full bandwidth is available to the user. The phone company does not use any portion of the bandwidth for framing or control bits.

clock

An oscillator-generated signal providing a timing reference for a transmission link; used to control timing functions such as sampling interval, signaling rate and duration of signal elements.

code conversion

The process of changing the bit grouping for a character in one code into the corresponding bit grouping for the character in another.

CMI (Control Mode Idle)

The process of changing the grouping for a character in one code into the corresponding bit grouping for the character in another.

communications port (Comm Port)

The electrical interface between a unit and the operator’s terminal. Operator commands and responses can be communicated through the Comm Port.

connector

A physical interface, such as DB-15 or RS-232-C, typically with male or female components.

CPE (Customer Premises Equipment)

Equipment that interfaces the telephone network and physically resides at the user's location.

CRC (Cyclic Redundancy Check)

An error checking scheme used to check the received data. The CRC bits within the framing are calculated using the contents of the frame. The calculation is performed again when the frame is received and the CRC values are compared. If they do not match, the frame is considered bad and the CRC statistic is incremental. Performance checking is done by both the carrier and the customer without causing any interference with the T-1 traffic.

CSU (Channel Service Unit)

The CPE used to terminate a digital circuit at the customer site. The CSU performs certain line-conditioning functions, ensures network compliance to FCC rules and responds to loopback commands. It ensures proper ones density in the bit stream and performs bipolar violation correction. The DSU and CSU are often in the same unit.

CTS (Clear to Send)

A signal issued by the DSU to indicate it is connected to the digital network and is ready to accept data.

CV (Code Violation)

Any code violation.

D

D4

Framing format for T1 transmission that places 12 T1 frames into a superframe. In ESF (a newer framing format) frames consist of 24 bits instead of the previous standard 12 bits as in D4 format.

DACS (Digital Access Cross-Connect Switch)

A digital switching device for routing and switching T1 lines and DS-0 portions of lines among multiple T1 ports. DACS performs all the functions of a normal switch, except that connections are typically set up in advance of a call, not together with a call, as in most, normal low-bandwidth communications systems (e.g. voice-band voice and data). A DACS is in essence a manual T-1 switch.

data link

Any serial data communication transmission path, generally between two adjacent nodes or devices and without any intermediate switching nodes.

data link layer

In the OSI model, the network processing entity that establishes, maintains and releases data link connections between adjacent elements in the network.

DCE (Data Circuit-Terminating Equipment)

Equipment that is either a part of the network, an access point to the network, a network node, or equipment at which a network circuit terminates.

dial-up

Describing the process of, or the equipment or facilities involved in, establishing a temporary connection via the switched telephone network.

digital loopback

A technique for testing the digital processing circuitry of a communications device; may be initiated locally or remotely via a telecommunications circuit. The device being tested returns a received test message, the results of which are compared to the original message.

DS-0 (Digital Signal Level 0)

A 64kbit/s standard digital telecommunications signal or channel.

DS-1 (Digital Signal Level 1)

The 1.544Mbit/s digital signal carried on a T1 facility.

DS-3 (Digital Signal Level 3)

The 44.736Mbit/s digital signal carried on a T3 facility.

DSU/CSU (Data Service Unit/Channel Service Units)

The pair of communications devices that connect an in-house line to an external digital circuit. At the customer's end of the telephone connection, the DSU/CSU takes data from terminals and computers, encodes it, and transmits it down the link. At the receive end, another DSU/CSU equalizes the received signal, filters it, and decodes it for interpretation by the end-user.

DSU (Data Service Unit)

A device designed to connect a DTE to a digital phone line. The DSU transmits and receives the signal and provides buffering and flow control. The DSU and CSU are often in the same unit. Also called a Digital Service Unit.

DSR (Data Set Ready)

A data port signal.

DSU Loopback

A DSU loopback is intended to include as much of the customer data communications circuitry in the looped-back path as possible. The signal passes from the remote unit into the local unit as far as the DSU. This test loops the received network signal back to the network.

DSU/CSU (Data Service Unit/Channel Service Units)
The pair of communications devices that connect an in-house line to an external digital circuit. At the customer's end of the telephone connection, the DSU/CSU takes data from terminals and computers, encodes it, and transmits it down the link. At the receive end, another DSU/CSU equalizes the received signal, filters it, and decodes it for interpretation by the end-user.

DSX-1 (Digital Signal Cross Connect Level 1)
Parameters set used when DS-1 signals are cross connected.

DTE (Data Terminal Equipment)
Terminal equipment connected to the DSU and used for communication over digital networks. May be a terminal, computer, printer or multiplexer.

DTE loopback
An EIA-232-D signal which indicates that the DTE is ready for operation.

DTR (Data Terminal Ready)
Signal from DTE to DSU/CSU.

E

EER (Excessive Error Rate)
Determined by counting the number of T1/T3 code violations during a time interval.

EFS (Error Free Seconds)
Occurs when a second is free of CRC-6 violations or Out of Frame (OOF) events or one or more BPV or OOF events.

EIA (Electronic Industries Association)
An organization which sets data communication industry standards.

encoding/decoding
The process of reformatting information into a format suitable for transmission, and then recovering it after transmission.

equalization
The spacing and operation of amplifiers so that the gain provided by the amplifier, per transmission frequency, coincides with the signal loss at the same frequency; circuitry that compensates for the differences in attenuation at different frequencies.

ES (Errored Second)
Occurs when a second has one or more OOF events or CRC violations or with one or more BPV or OOF events.

ESF (Extended Superframe Format)
A new T1 framing standard used in Wide Area Networks (WANs). With this format 24 frames, instead of 12 are grouped together. ESF provides frame synchronization, cyclic redundancy checking and data link bits in overhead. It allows more information to be stored and retrieved easily, facilitating network performance monitoring and maintenance.

F

failed signal state
Occurs when ten consecutive severely errored seconds are detected.

far end
The unit or units remote from the user.

FE (Framing Errors)
Occurs when the end of a frame is not detected where it should be.

FDL (Facility Data Link)
A four Kbps data channel provided by 12 of the 24 ESF framing bits. It is used by the carrier to request reports, clear error counters and activate loop backs.

FG (Frame Ground)
A signal from DTE to DSU/CSU.

fractional bandwidth DTE loopback
A loopback test that loops back the signal at the network interface. See also **loopback.**

Fractional T1
A service that provides less than full T1 capacity (one or more 64 Kbps channels are provided).

frame
A group of bits sent serially over a communications channel. The basic data transmission unit employed with bit oriented protocols.

frame relay
A high-speed packet switching protocol used for wide area networks (WANs); faster than traditional X.25 networks, because it was designed for today's reliable circuits and performs less rigorous error detection. Frame relay networks use bandwidth only when there is traffic to send. Frame relay does not support voice.

framing
A technique which separates incoming bits into identifiable groups to enable the receiving device to recognize and reconstruct them.

frame ground

A metallic layer acting as a shield, consisting of tape, braid, wire or sheath and surrounding insulated conductors in cable. It may be the metallic sheath of the cable or the metallic layer inside a nonmetallic sheath. It reduces stray electrical fields, prevents outside electrical interference, drains off current induced by lightning and provides for safety of personnel.

frequency

The number of repetitions per unit time of a complete waveform. The number of complete cycles per unit of time, usually expressed in Hz.

full bandwidth DTE loopback

A loopback test that loops back the signal at the multiplexer. See also **loopback.**

H

HDLC (High Level Data Link Control)

Bit-oriented, data-link control protocol; any related control of data links by specified series of bits, rather than by control characters.

I

IP address

A unique, 32-bit identifier for a TCP/IP host on a network. IP addresses are normally printed in dotted decimal form, such as

L

LBO (Line Build Out)

An adjustable value used to tune the attenuation between the DSU/CSU card and the last repeater on the T1 circuit.

LED (Light emitting diode)

A device that accepts electrical signals and converts the energy to a light signal.

LOF (Loss of Frame)

Occurs when a received digital signal loses frame synchronization.

LOFC (Loss of Frame Count)

A count of declared Loss of Frame events (ESF framing only).

loopback

A diagnostic test in which the transmitted signal is returned to the sending device after passing through a data communications link or network. This allows a technician (or built-in diagnostic circuit) to compare the returned signal with the transmitted signal and get some sense of what's wrong.

LOS (Loss of Signal)

Occurs when an input signal is detected as all zeros for 176 bit times.

loss

A reduction in signal strength, expressed in decibels.

LSC (Loopback Select Code)

An indicator describing a DSU loopback characteristic. LSC is a minimum of 35 LSC bytes of S11101F1 with secondary channel.

LT (Local Test)

A data port signal to DSU/CSU.

M

mask

Refer to subnet mask.

MIB (Management Information Base)

A structure that defines what is obtainable from a network device and what can be controlled. It has a directory listing the logical names of all information resources residing in the network and pertinent to the network's management. It is used to describe network management variables.

multiplexer

Any device that allows two or more users to share a common physical transmission medium. Employed in pairs, where each device performs both multiplexing of the multiple user inputs and demultiplexing of the channel back into the separate user data streams.

multiplexing

The combining of multiple data channels onto a single transmission medium. Typically, data streams are interleaved on a bit or byte basis (time division) or separated by different carrier frequencies (frequency division).

multidrop

A communications arrangement where multiple devices share a common transmission channel, though only one may transmit at a time.

N

NEBS

A network Equipment Building Systems requirement. A standard issued by Bellcore that spells out central office standards for grounding, cabling and power.

network

An interconnection of computer systems, terminals, or data communications facilities.

NI (Network Interface)

The point of demarcation between the customer premises and the carrier's network, usually drawn at the network connector on the rear panel of the Digital Link access device.

NRZ (Non-Return to Zero)

A binary encoding and transmission scheme where “ones” and “zeros” are represented by opposite, and alternating, high and low voltages.

NRZI (Non-Return to Zero Inverted)

A binary encoding technique that inverts the signal on a “one” and leaves the signal unchanged for a “zero,” where a change in voltage state signals a “one” bit and the absence of a change denotes a “zero” bit value.

O

OOS (Out of Service)

A digital network trouble signal.

OOF (Out of Frame)

An error checking scheme. An OOF occurs when two out of four consecutive framing bits are in error.

P

parity bit

An additional, non-informational bit appended to a group of bits indicating that the number of “ones” in the bits group is odd or even.

parity check

A process of error checking using the parity bit.

polarity

Any condition where there are two opposing charges, such as positive and negative.

port

The physical point of access into a computer, network or other electronic device.

protocol

A formal set of rules governing the format, timing, sequencing and error control of exchanged messages on a data network.

R

RD (Receive Data)
A data port signal.

receiver
The receiver synchronizes the framing pattern, separates the frame bits from the payload data and monitors for frame errors in 64K mode. It achieves frame synchronization within 5msec (ANSI T1.410-1992 Section 8.2).

repeater
Equipment that receives a pulse train, amplifies it, retimes it, and then reconstructs the signal for retransmission.

return to zero
Method of transmitting binary information such that, after each encode bit, voltage returns to the zero level.

RI (Ring Indicator)
A data port signal.

RJ48S
An 8-position keyed jack used to connect services that are covered under FCC Part 68 Rules, such as public switched digital service (PSDS), switched 56, 19.2 Kbps service, 64 Kbps service, and synchronous digital data with secondary channel.

RLSD
Receive Line Signal Detect, a data port signal

RS232
A TIA/EIA standard for serial transmission.

RS232-C
An EIA specified physical interface, with associated electrical signaling, between data circuit terminating equipment (DCE) and data terminating equipment (DTE).

RS449
A common 37-position interface for data terminal equipment and data circuit terminating equipment employing serial binary data interchange. It is a balanced interface, based on unipolar digital signals, depending more on current flow than voltage, therefore supports greater distances than the RS-232 interface.

RTS (Request to Send)
A signal sent by DTE to DSU/CSU indicating DTE has data ready to transmit.

S

SCR (Serial Clock Receive)
A unipolar clock from the DCE signal. A data port signal.

SCT (Serial Clock Transmit)
A unipolar clock from the DCE signal. A data port signal.

SCTE (Serial Clock Transmit External)
The clock signal is echoed from the DTE for the purpose of timing incoming data on long cable runs.

scrambler
A device or software program that encodes data for encryption. It distorts a voice or data conversation so that only another like device can figure out the content of the message.

SD (Send Data)
A signal from DTE to DSU/CSU.

secondary channel
A subchannel derived from the main channel. It does not carry data messages and is used for diagnostic or supervisory purposes.

serial transmission
A sequential transmission of bits constituting an entity of data over a data circuit.

SES (Severely Errored Second)
A second during which 320 or more CRC violations or OOF events have occurred (ESF framing only).

SG (Signal Ground)
A signal from DTE to DSU/CSU.

simplex current
One way transmission used by Telco to provide power to repeaters.

SLIP (Serial Line IP)
A TCP/IP protocol that allows IP packets to be transmitted over a serial link, such as a dial-up or private telephone line.

SMDS (Switched Multimegabit Data Service)
A fast-packet technology based on the connection-less data networking capability described in the IEEE 802.6 specification. The data format for SMDS is "cell oriented." SMDS does not support voice.

SNMP (Simple Network Management Protocol)

A widely-used network monitoring and control protocol. Data is passed from SNMP agents (hardware and/or software processes reporting activity in each network device, hub, router, bridge, etc.) to the workstation console used to oversee the network. The agents return information contained in a MIB (Management Information Base), which is a structure that defines what is obtainable from the device and what can be controlled.

stop bit

The last transmitted element in each character, which permits the receiver to come to an idle condition before accepting another character.

subnet mask

The number of bits in an IP address used for the subnet address.

synchronous transmission

Data communications in which characters or bits are sent at a fixed rate and the transmitting and receiving devices are synchronized.

T

T1

A digital carrier facility used to transmit a DS-1 formatted digital signal at 1.544 Mbps. T-1 normally can handle 24 voice conversations, each one digitized at 64kbps. But, with more advanced digital voice encoding techniques, it can handle more voice channels. T-1 is a standard for digital transmission in North America. T-1 lines are used for connecting networks across remote distances.

T3

A digital carrier facility used to transmit a DS-3 formatted digital signal at 44.736 Mbps.

T-Carrier

A time-division, multiplexed digital transmission facility, usually operating at an aggregate data rate of 1.544 Mbps.

telnet

A remote terminal application that enables the user to log on to a remote computer on the same IP network. The user can work from the PC as if it were a terminal attached by a hard-wired line to the remote computer. The application uses the *Telnet* Internet protocol.

transmitter

In 64K mode, the transmitter inserts the frame bit, with a fixed pattern of 101100.

TRAP

A mechanism by which a device automatically sends an alarm for certain network events to a management station. The management station can initiate a polling sequence to the device to determine the cause of the problem.

U

UAS (Unavailable Seconds)

Number of seconds elapsed after 10 consecutive SES events are received (ESF framing only).

V

V.35

A CCITT standard for the trunk interface between a network access device and a packet network. It defines signaling for data rates greater than 19.2 Kbps.

V.52

Terminal emulation standard. CCITT standard (1976) for various loopback tests that can be incorporated into modems for testing the telephone circuit and isolating transmission problems. Operating modes include local and remote digital loopback and local and remote analog loopback.

V.54

A CCITT standard for loop test devices in modems. It defines local and remote loopbacks.

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